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Loomis,
J.

Walsh

A Critical Summary of Empirical Estimates of the Values of Wildlife, Wilderness and General Recreation Related to National Forest Regions[1]

John Loomis, Economist
Cindy Sorg, Wildlife Biologist

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John Loomis, Economist
Department of Economics
Colorado State University
Fort Collins, Colorado

Cindy Sorg, Wildlife Biologist
Valuation of Wildland Resource Benefits Research Project
Rocky Mountain Forest and Range Experiment Station
Fort Collins, Colorado

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TABLE OF CONTENTS

	Page
EXECUTIVE SUMMARY	
Study Methodology	2
Evaluation Criteria and Adjustments Necessary For Comparability of Values	5
Factors Affecting Real Values Over Time	15
Summary of Recommended Values by Region	17
STUDY RESULTS	
Anadromous Fishing	19
Big Game Hunting	25
Camping	37
Downhill Skiing	44
Fishing, Cold Water	50
Fishing, Warm Water	61
Fishing, Salt Water	68
Hiking	72
Motorized Boating	79
Motorized Travel	84
Nonmotorized Boating	88
Picknicking	95
Small Game Hunting	101
Upland Game Hunting	107
Waterfowl Hunting	112
Water Sports	120
Wilderness	126

STUDY METHODOLOGY

The data base for this review came from several annotated bibliographies of recreation economics, studies provided by the panel and our own libraries of published and unpublished articles, reports, and manuscripts.

We relied on studies that estimated the net value (value over and above actual expenditures) using primarily the Contingent Value Method (CVM) and Travel Cost Method (TCM). These methods are approved by an interagency committee of the Federal government (U.S. Water Resources Council) for use in recreation estimation by the Soil Conservation Service (U.S. Department of Agriculture), Bureau of Reclamation (U.S. Department of Interior), Army Corps of Engineers (U.S. Department of Defense), and Fish and Wildlife Service (U.S. Department of Interior). As of the time of this report, use of TCM and CVM are required for agency projects or plans affecting more than 500,000 visits annually (U.S. Water Resources Council, 1979). These two techniques are also the preferred methodologies of natural resource economists (Dwyer, Kelly, and Bowes 1977 and Knetsch and Davis 1966). We also used one study from Louisiana that used the Household Production or "Hedonic Method" (Bell 1981) and one study that used a "Hedonic-Travel Cost Method Synthesis" (Brown and Plummer 1979). Both of these approaches represent the state of the art of new and promising valuation methodologies. The U.S. Water Resources Council (1979) does not preclude use of new techniques such as these.

Since a majority of the empirical studies estimated the net value of a certain recreation activity at a specific site given or adjusting for the availability of existing or substitute sites, the values reported represent marginal values for an additional recreation site, herd unit, stream or wilderness area.

This critical evaluation and standardization of values found in TCM and CVM studies represents an improvement over the 1980 RPA effort for recreation. This is largely due to the tremendous increase in availability of TCM and CVM studies of recreation since 1978. However, advances in the theoretical foundation and empirical applications have made possible the beginnings of a general nonmarket valuation framework within the context of microeconomic theory and econometrics that provides "rules" for generating comparability between various applications of TCM and CVM (see Bocksteal and McConnell 1981 and Brown, Sorhus, Chou-Yang, and Richards).

However, to repeat Dwyers "message" (1978) in his similar effort to derive 1980 RPA values for recreation, these surveys of the literature are not perfect substitutes for Region specific estimates of the value of recreation. This can be done by the Regions using TCM with their campground fee receipts, wilderness permits and state game data to name a few of the obvious data sources. A few forests are already performing TCM studies. A systematic effort to harness the existing data and skills within each Forest would provide more Region specific values for future RPA Assessments-Programs as well as in National Forest Plans. The values provided in this report represent the most comprehensive and systematic evaluation of empirical estimates of recreation known to us and to members of the panel. We wish to emphasize that these values are appropriate for efficiency type analysis.

The preparation of this report and the values presented herein was as follows: The authors compiled and reviewed all of the available empirical studies. Some studies were rejected because their results were in concept or in format not relevant (e.g., dollar values on an annual basis). The authors formulated an initial set of adjustment criteria and size of each adjustment.

Initial dollar values were calculated based on these adjustments. Then the adjustment criteria, size of adjustment and values were submitted to the panel for review. After meeting with the panel members, the size of the adjustments were modified and the dollar values recalculated based on the new adjustment guidance. What follows is the discussion of the adjustment criteria and the size of the adjustment recommended by the panel.

EVALUATION CRITERIA AND ADJUSTMENTS NECESSARY FOR COMPARABILITY OF VALUES

While nearly all of the studies utilized are Travel Cost Method (TCM) or Contingent Value Method (CVM) studies (except as noted), some were performed before certain refinements in the methodology were developed and others represented applications designed to highlight some aspect of resource valuation. Therefore, standardization of the resulting dollar values was necessary to allow the earlier, more developmental applications to be commensurate with more recent applications. In addition, adjustment was necessary to bring 1965 or 1970 dollar values to 1982 dollar values.

All of the following types of adjustments are supported by the economic literature and were reviewed and approved by the panel:

A. For studies which did not report dollar values per day (e.g., per trip) put them on a per day basis.

B. Adjust dollar values to the January 1982 base year, using the GNP price deflator.

C. Adjust for omission of travel time is estimating TCM demand curve.

D. Adjust values derived by "individual observation" TCM for those activities where probability of participation is expected to vary significantly with travel cost.

E. Adjust values for restriction of TCM sample to instate residents.

F. Adjust for omission of protest mechanism in CVM studies.

G. Conversion to 12-hour RVD.

H. Quality-scarcity adjustment for regions without studies.

Most studies that required an adjustment, required only one or two types of adjustment. A more detailed rationale and documentation for the appropriateness of each adjustment follow:

Adjustment to Activity Day

Many studies reported values per "visitor day," "activity day," or "activity occasion." The final adjustment to a 12-hour Recreation Visitor Day needed by the Forest Service was the last step because in this way, the varying lengths of stay between regions could be made after all other adjustments are made. However, for the few studies that did report values per trip, conversion to an activity day was still necessary. If the studies reported a trip averaged 1.5 days, we simply divided the value per trip by 1.5. Since 1.5 days means on the average half the people spent 1 day and half 2 days, this calculation produces a reasonable conversion from trips to days. Data on days per trip were derived from the studies themselves, by calling the study author(s) or by calling the appropriate State Fish and Game Department for an average length of hunting or fishing activities. Some studies reported recreation site value for the activity. This was divided by number of visitor days or trips to get value for the respective unit.

Updating Study Values to 1982

Like the nominal value of any consumer good or service, the nominal value of recreation services provided by a Forest Service site is expected to rise with the rise in the general price level. In this sense, recreation is similar to any consumer good in that its nominal value rises as inflation pushes up the nominal value of all goods. Therefore, to make the nominal values of studies performed at different dates useful for decisionmaking, we adjusted all nominal values of recreation to a common base year, January 1982. We did this using the GNP implicit price deflator.

Adjustment for Travel Time

As early as 1965 researchers (Cesario and Knetsch 1970) became aware that omission of travel time from the travel cost variable would lead to a substantial downward bias in the estimated benefits derived under the Travel Cost Method.[2]

That this concern is legitimate can be seen easily by reference to Figure 1. The inside demand curve reflects statistical estimation using out of pocket travel costs only. This obviously ignores the deterrent effect that the travel time constraint imposes on taking more visits . This inside demand curve says that if you raised the cost to recreationist in County A from $5 to $10 per trip, that these recreationists would cut back visitation to the quantity taken by recreationists in County B. However, recreationists in County B incurred a price of $10 Travel Cost and 1-hour travel time. Recreationists in County A, with the addition of $5 to its original $5 incurs a travel cost of $10 but still incurs only their original travel time of 1/2 hour. Thus, the new price paid by recreationists in County A is still less than County B. Hence we would expect recreationists in County A to consume more visits at $10 TC than recreationists in County B. This "time corrected" demand curve is the outer dashed one. The value of recreation (measured as the area above the travel cost, but below the demand curve) is obviously larger for the "time corrected" demand curve.

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[2]We would hope that most readers understand that the Travel Cost Method estimates the values of recreation by using the variation in travel costs to trace out a demand curve. Like market commodities, the value is then derived from the demand curve. The TCM does not directly use the travel costs as the measure of value (what has been called the expenditure method) but rather uses the travel costs to derive the demand curve. See Clawson and Knetsch (1966) for more details.

Since it is generally recognized that for most recreation activities, the travel time price is just as important a deterrent to taking more types as the travel cost (Cesario and Knetsch 1970; Brown and Nawas 1973; Wilman 1980; McConnel and Strand 1981) a great deal of effort has gone into alternative ways of adjusting for travel time. The most direct method is to disaggregate the data into its original "individual observations" and then specify a separate independent variable. This was demonstrated by Brown and Nawas (1973) and has since been adopted by many other researchers (Martin, Gum, and Smith 1975; Ward 1982).

Another avenue has been to actually place a dollar value on time and add it to the travel costs (Cesario 1976). The value of travel time from commuting studies was estimated to be between one-fourth and one-half the wage rate (Cesario 1976). McConnel and Strand (1981) in a sport fishing application found a value of 60 percent the wage rate. Bishop and Heberlein (1980) found that when travel time was valued at one-half the hourly income rate than the TCM derived values began to come closer to the actual cash value of the goose hunting permit. Ward (1982) has used a technique similar in spirit to McConnel and Strand to derive a value of travel time in southeastern New Mexico. He arrives at an average value of travel time $7.10 per hour.

Ward's work provides a starting point to begin actual adjustments for studies that omitted travel time. His work, along with Bishop and Heberlein, shows that the magnitude of the benefit estimates vary with the change in value of travel time. Bishop and Heberlein found a 150 percent increase in the value of goose hunting when travel time went from a zero value (i.e., travel time omitted) to one-quarter of the hourly income rate. This seems a great deal higher than has been found in other studies. For example, Ward found benefits increased by 60 percent when the value of travel time was increased from zero to 40 percent of his derived value of travel time.

While there is close to unanimity in the literature on the need to include travel time, the exact size of the correction of benefit estimates from studies which omitted travel time is not known with precision. We originally suggested a 50 percent upward adjustment as being consistent with a minimum value found in the literature for omission of a value of travel time between one-quarter and one-third the wage rate. The panel felt that for a few recreation activities where travel time was short (an hour or less) that this might be too high. Since neither the panel nor the authors had sufficient information to vary the value of travel time by activity, a more conservative 30 percent upward adjustment was agreed upon as an average adjustment for all activities.

Adjustment for Use of "Individual Observation" Travel Cost Method

Pioneered by Brown and Nawas (1973) the use of individual observations instead of zone aggregates as the dependent variable has gained widespread acceptability. The individual observation method uses trips or visits per year to site x by a given household or person as the dependent variable. Zonal TCM uses visits per capita from a county or zone of origin. As Brown, Sorhus, Chou-Yang, and Richards conclude, while the individual observation TCM is econometrically more efficient, it omits the effect of travel costs on the probability of participation. That is, as travel cost to a site increase, both the number of trips taken by participants and the number of participants per capita changes. This is consistent with the way Cicchetti (1973) has dichotomized recreation use estimation processes. However, the individual observation method omits the effect of higher travel costs on lower probability of participation and leads to a more inelastic (steeper) demand curve (Brown et al.). This more inelastic demand curve tends to result in overstating the recreation benefits if the probability of participation decreases significantly at higher travel costs.

Since it is unlikely that probability of participation increases with higher travel costs, some downward adjustment in net value of recreation estimated by individual observation is called for. The exact size of the downward adjustment depends on the degree to which probability of participation decreases with travel cost.

Since this change in probability of participation as a function of travel cost is likely to vary by activity, the panel felt that the 30 percent across the board downward adjustment that we suggested originally was, on average, too great. Members of the panel suggested that the range of downward adjustment be between 0 and 30 percent. For activities in which individuals have acquired specialized equipment and skill the probability of participation was felt to be less influenced by travel costs than activities where specialized skill and equipment was not involved. To more accurately adjust individual observations, how the probability of visiting a particular site varies with travel costs is needed. Unfortunately, this information is not readily available given the time constraints placed on this study.

(NOTE: Visits per year by the individual is still a function of travel costs.) This guideline provided us with adjustment method for activity values within the 0 to 30 percent range and is consistent with the U.S. Water Resources Council (1979) criteria on specialized versus general recreation.

Adjustment in TCM Studies for Restriction to Instate Users

One of the assumptions of the Travel Cost Method (TCM) is that, at each travel cost, any user who wishes to visit the site is not excluded. If in recording use levels at each travel cost via a household survey out-of-state users are excluded, the visitation rate is not correct. Generally, most out-of-state users will have traveled further than instate users. Omission of

out-of-state users tends to result in an underestimation of visits at relatively high travel costs. The effect on the demand curve and benefit estimates is similar to the of omission of travel time. That is, benefits will tend to be underestimated to the degree that out-of-state users travel further distances to instate users. This underestimate is further aggravated when log-log demand curves are used, because to produce a definite upper limit for benefit calculation, often times the highest observed travel cost is used. If out-of-state users travel further than resident users, then this omission in the sample TCM, will further reduce benefits estimates if they calculated in this manner.

It was the view of the panel that omission of out of state users was likely to produce the most serious underestimate of benefits for activities such as big game hunting, waterfowl hunting, cold water fishing, anadromous fishing, and boating. The authors used these guidelines and adjusted values for these activities by 15 to 20 percent.

Omission of Protest Mechanism in Contingent Value Method (CVM) Studies

The Contingent Value Method is also known as the "bidding game" or direct survey method. CVM solicits a marginal value for recreating at a specific site, given the availability of alternative sites and activities. While the method has been criticized by some, Schulze, d'Arge, and Brookshire (1981), Thayer (1981), and Brookshire, et al. (1982) provide substantial empirical evidence that CVM provides values consistent with economic theory and other methods of nonmarket valuation.

In recent CVM applications, it has been customary to include what is known as a "protest mechanism" to check to see if some proportion of the zero bids are rejection of the bidding game method itself or in fact zero value beyond current expenditures for the good under study. For example, use of taxes, utility bills, or license fee may be viewed as an inequitable way of paying for the good in that nonresidents or nonhunters/ fishermen would benefit from provision without paying any costs. With these types of payment devises in particular, many zero "bids" may reflect a protest against this inequitable payment vehicle. If no cross check is done to investigate why persons bid zero, all zero bids are attributed to the resource value. The U.S. Water Resources Council (1979) indicates that the protest zero bids should not be included in value estimates as they would result in underestimation of the benefits.

Since acceptable CVM applications are supposed to have no more than 15 percent of such protest bids (U.S. Water Resources Council 1979), the panel recommended that an upward adjustment of up to 15 percent for omission of a protest mechanism was appropriate for sensitive payment devices. Such payment devices include utility bills, taxes, and license fees. This guideline was used in reconciling dollar values estimated by different studies and in suggesting recommended regional values.

Conversion of Dollar Values to a 12-Hour Recreation Visitor Day (RVD)

The U.S.D.A. Forest Service reports current and future recreation use on the basis of 12-hour Recreation Visitor Day (RVD). Thus, it was necessary to put values on a 12-hour basis. Developing a logical basis for doing this turned out to be quite a challenge for both the authors and the members of the panel for several reasons. First, many studies reported a value per visitor day of undefined length. Secondly, the Recreation Information Management (RIM)

numbers given to us that estimated length of activity occasion were not accepted by the panel due to concern about possible lack of accuracy. Even where the studies reported length of time engaged in the activity that day, there was some difficulty in allocating all of the trip value to that one dominant activity since in some cases several activities took place at the site. For example, overnight hunting trips involve camping. In most cases, the recreationist would not have gone there to go camping unless he was engaged in big game hunting. While CVM can value just the hunting day if the question is structured in that manner, TCM values the entire day or trip. Thus, TCM easily provides a value for the site but less easily for each activity at the site, if there are more than one activity.

It was the opinion of the panel that, in TCM studies, the value of a day should be allocated to the dominant or primary activity. By this we mean the activity that if it had not been present at that site the individual would not have visited the site.

A consensus was reached by the panel to use the following guidelines:

1. When the study reports, or personal communication with the study's authors, provide a specific number of hours for the activity, then the values will be converted to a 12-hour RVD on that basis.

2. When no specific information exists in the study, a determination will be made as to whether to the activity values reported per day are close enough to make up a large part of a 12-hour day or not. If they are viewed as being long enough to be considered a full day (7 hours or more) no multiplication will be made. For activities taking a half day or less (1-6 hours) the value will be doubled. This results in a conservative value per RVD.

In all cases, the conversion to a 12-hour day is described so that it is possible to reconstruct the value per activity day in a different way.

Quality-Scarcity Adjustment for Regions Without Site Specific Studies

Once a value per RVD is arrived at from a particular study, it may or may not be proper to generalize it to a Forest Service Region. As the attached map indicates, these Forest Service Regions are quite large. A value for boating in Utah, may not be correct for boating in Idaho and Nevada. Similarly, a value for downhill skiing in the Rocky Mountain Region is not necessarily the value of downhill skiing in the Pacific Northwest or the Northeast. Ideally, Region-specific studies would provide the appropriate values for each area of the country. In the absence of this, and following Dwyer's 1980 RPA effort, population, supply, and quality were used to adjust site specific values within and between regions. Population size relative to supply was used to reflect scarcity. Obviously, the lower the recreation opportunity in the region is, the more valuable additional recreation sites are. In economic terms, population and quality may be viewed as demand shifters and scarcity of supply as determining the position of the supply curve. The marginal value of an additional site is given by the intersection of the two curves. This framework was used and factors considered were made explicit in developing values for regions without site-specific studies from regions with site-specific studies.

FACTORS INFLUENCING REAL VALUES OVER TIME

The change in real value (after inflation) of natural resources over time reflects relative shifts in supply and demand curves. If the demand is expected to rise faster than supply, then the real price or marginal value of the resource will rise. Determining the rate at which the real value changes thus depends on examining the changes in demand relative to supply.

Consumption of all types of leisure activities such as outdoor recreation on the forest is expected to rise over time. This is well documented in the work of Hof and Kaiser (1981), Ciccetti (1973), USDA (1980), and Loomis (1982) to name just a few. Population growth, movement of population westward in closer proximity to the national forests, and trends toward a service sector economy of highly educated professional workers are among the major influences on the demand side.

As Hendee, Stankey, and Lucas, (1978) point out, the current and future trends are toward more apreciative forms of recreation. They also note that the demand for wilderness recreation in particular has grown at a more rapid rate from that of general recreation.

On the supply side, we must consider our economy's ability to produce more recreation as a result of rising demands. If the National Forest System or the private sector can effectively supply more outdoor recreation of the current quality as the demand rises, then the rate of increase in real marginal value will be very small.

Quite obviously, these ownerships can technically produce more developed recreation. We have the technology to build roads and campsites. These ownerships can provide more opportunities for motorized boating via accessing new lakes or building new lakes (i.e., reservoirs). More opportunities for motorized recreation on land can be provided. Thus the critical question for these types of activities is whether the Forest Service budget will respond

to increased demand and provide more recreation opportunities of this type. If the Forest Service acts like an efficient company, when demand increases, it would provide more services. This increased supply will moderate the rise in real marginal value over time associated with increased demand along an upward sloping supply curve. If the Forest Service does not fully respond, then the real value can be expected to rise at a fairly rapid rate over time relative to goods produced in the private sector (beef, clothing, household appliances).

When we turn to supply of opportunities for recreation activities such as wilderness and nonmotorized boating, we encounter a restricted technical ability to supply more of these goods. Our technology does not allow for increasing the supply of pristine wilderness areas and salmon spawning beds or salmon runs. Supplying additional free flowing streams for rafting and kayaking also seems beyond our technological capability (and even if not is certainly prohibitively expensive). Thus, for these activities, we face a close to perfectly vertical supply curve, i.e., the current supply is all that can be produced, regardless of price.

Combining these likely future reductions in supply with the high rates of increased demand alluded to earlier, can only lead to the conclusion that the real value of activity days provided in these activities will rise dramatically. Krutilla and Fisher (1975) have argued that we should expect the value of these irreplaceable resources to

(1) rise faster in real terms than renewable resources for which a positive supply response is possible, and

(2) to rise faster in real terms than resources which are merely inputs into a production process.

This latter point rests on the view that, the final consumer goods such as electricity, paper, or beef can be produced using several different types and combinations of inputs. Electricity can be produced with coal, oil, gas, hydro, or nuclear. Thus, there is a large degree of substitutability in producing electricity or paper. However, Krutilla and Fisher go on to argue that wilderness, and free flowing rivers are the final consumer goods themselves, and there is no production process that allows other resources to be substituted for them. Krutilla and Fisher also stress that technological change will improve the efficiency of our production processes for converting raw resources into finished products. This will also moderate the increases in real value over time due to rising demand. They note that no such force is operable in the case of wilderness or free flowing rivers.

While precise future real values cannot be given, it should be quite apparent that the real value of irreplaceable recreation opportunities will rise at a rate as fast if not usually faster than that for renewable resources, particularly those that are inputs into production processes.

SUMMARY OF RECOMMENDED VALUES

Application of all of the adjustment criteria (except for real values over time) to the values found in the literature resulted in values per activity day. These were then adjusted so as to be representative of that Region to produce a Regional Value. These were then converted to an RVD basis. Using values from Regions with studies, population, supply and quality factors, values for Regions without studies were derived.

The following table summarizes our recommended values. While values for some activities or some regions may not be ranked as the reader might desire, details of the specific studies and the rationale for each value is presented in the appendix to this report.

Recommended Regional Recreation Activity Values per RVD

Recreation Activity	(1) Northern	(2) Rocky Mountain	(3) Southwestern	(4) Intermountain	(5) Pacific Southwest	(6) Pacific Northwest	(8) Southern	(9) Eastern
Anadromous Fishing	36	N/A	N/A	36	50	52	N/A	60
Cold Water Fishing	17	18	22	17	19	24	13	24
Warm Water Fishing	15	16	20	16	18	N/A	24	21
Salt Water Fishing	N/A	N/A	N/A	N/A	53	50	50	55
Big Game Hunting	50	65	48	50	48	48	40	60
Small Game Hunting	21	26	22	23	22	21	28	25
Waterfowl Hunting	39	28	25	32	30	40	25	31
Upland Game Hunting	39	39	38	37	37	40	40	39
Motorized Boating	9	12	16	11	10	6	10	20
Nonmotorized Boating	18	16	19	24	14	10	8	15
Motorized Travel	11	12	11	10	13	12	11	14
Camping	8	10	15	8	12	9	16	17
Picnicking	7	14	14	8	8	10	10	12
Hiking	13	15	16	14	17	16	20	28
Wilderness	20	20	22	20	22	28	25	28
Downhill Skiing	48	54	50	54	56	50	46	56
Water Sports	10	12	14	12	15	12	15	18

ANADROMOUS FISHING

I. LITERATURE REVIEWED

Region 6

There have been several studies over the last two decades which have estimated net economic values for salmon and steelhead sport fishing in Oregon and salmon sport fishing in Washington. The most relevant of these include:

1. A 1976 revision by Brown, Larson, Johnston and Wahle (1976) of the original Brown, Singh, and Castle (1964) Zonal Travel Cost Method. In this study, the 1962 data was reestimated using an adjustment for travel time. This also updated the base data from 1962 to 1974 dollars. Their estimate of $21.77 per day was a state average for Oregon salmon-steelhead fishing.

2. Mathews and Brown (1970) used the Contingent Value Method to estimate the value of salmon sportfishing in Washington . They expressly addressed availability of substitutes when asking their value questions. They found a state average value of $38.75 in Washington.

3. The most recent zonal Travel Cost Method application by Brown, Sorhus, and Gibbs, 1980, yielded estimated values of $17.36 per 3.3 hour day for a state average in Oregon. The state average for Washington was $20.92 per day and also estimated using the zonal Travel Cost Method. Both of these were based on a large mail survey of residents. The equations for Oregon considered the effect of travel time, but in Washington only one of the three equations considered travel time.

4. A more recent Contingent Value Method survey by Crutchfield and Schelle (1979) yielded a willingness to pay value of $18 per day for ocean sport fishing in Washington.

Region 1 and 4

A state average value of sport salmon fishing in Idaho was estimated by Gordon (1970) using the Zonal Travel Cost Method as $17 a day. As was typical of studies at this time, no adjustment was made for travel time.

II. METHODOLOGICAL ADJUSTMENTS

A. Conversion of values from study date to 1982.

Region 6

The updated, Oregon State University values go from $21.77 to $33.62. The updated Mathews and Brown value is $99.02 per day. The recent Brown, Sorhus, and Gibbs value for Oregon is updated to $25.00 and to $30.12 for Washington per day. The Crutchfield and Schelle updated values are $25.92 per day.

Region 1 and 4

Updating Gordons (1970) study using 1968 data to 1981, yielded a value of $41.70 per day.

B. Adjustment for omission of travel time

As discussed in the introduction, this issue is relevant for Travel Cost Method Applications. Two of the three Brown, Sorhus, and Gibbs TCM equations for Washington did not adjust for travel time. Since these were developed for less important salmon areas, we will make no adjustment to the values contributed by these two equations to be conservative.

In the case of Gordon's study in Idaho, no consideration of travel time was made. The updated value must be adjusted upward by 30% with the resulting value of $54.21 per day.

D. Adjustment due to instate sample.

As discussed in the introduction and recommended by our panel, limitation of the sample to instate residents leads to an under-estimate of the benefits derived from TCM. For relatively unique activities, such as salmon fishing, this omission of out of state users was thought to be a concern not only by the panel but is also noted in Brown, Sorhus, and Gibbs paper (1980) as well. Thus both the Brown, Sorhus, and Gibbs values for Oregon and Washington and the Oregon State University values for Oregon need to be adjusted upward by 15%. Making this adjustment results in values of $28.75 and $34.64 for Oregon and Washington, respectively for the Brown, Sorhus, and Gibbs values and $38.66 for Brown et al. (1976) values.

E. Adjustment for individual observation TCM.

Only the Brown et al. (1976) study utilized individual observation TCM. However, the panel felt that the probability of participation in anodromous fishing did not have a strong inverse relationship to travel costs and, therefore, no adjustment was necessary for this activity.

III. VALUES FOR REGIONS WITH STUDIES

Region 6

The values for Oregon are $28.75 to $38.66. Since both of these reflect state averages, it seems difficult to choose. However, more weight will be given to the most recent of these two studies and thus a value of $32 for Oregon appears reasonable. The $32 is for a day length of 3.4 hours. As discussed in the introduction, to put this on a full activity day value we need to double this value to $64. In Washington, the values range from $25.92 to $99.02. However, the two most recent studies are $25.92 and $34.64. To be conservative, a value for Washington of around $40 also seems appropriate. Thus the value per activity day for Region 6 was built from $64 and $40. Given these two state averages a value of $52 seems well suggested by the available literature.

Region 1

Gordons (1970) study of Idaho, is the only piece of evidence on the value of anadromous sport fishing in this region. What little anadromous fishing that exists in Montana would be quite valuable due to its scarcity. However, the quality cannot rival that of Region 6. Given the higher population and income levels in Region 6 and its higher quality, the value in Region 1 should be lowered from $54. Perhaps $36 is an estimate that reflects the low demand but scarcity in this Region. Since no data is available to indicate how many hours are fished per day for this species, the $36 will be a recommended value per RVD.

4. A more recent Contingent Value Method survey by Crutchfield and Schelle (1979) yielded a value of $18 per day as a state average for Washington.

Region 1 and 4

A state average value of sport salmon fishing in Idaho was estimated by Gordon (1970) using the Zonal Travel Cost Method as $17 a day. As was typical of studies at this time, no adjustment was made for travel time.

II. METHODOLOGICAL ADJUSTMENTS

A. Conversion of values from study date to 1982.

Region 6

The updated, Oregon State University values go from $21.77 to $33.62. The updated Mathews and Brown value is $99.02 per day. The recent Brown, Sorhus, and Gibbs value for Oregon is updated to $25.00 and to $30.12 for Washington per day. The Crutchfield and Schelle updated values are $25.92 per day.

Region 1 and 4

Updating Gordons (1970) study using 1968 data to 1981, yielded a value of $41.70 per day.

B. Adjustment for omission of travel time

As discussed in the introduction, this issue is relevant for Travel Cost Method Applications. Two of the three Brown, Sorhus, and Gibbs TCM equations for Washington did not adjust for travel time. Since these were developed for less important salmon areas, we will make no adjustment to the values contributed by these two equations to be conservative.

ANODROMOUS FISHING	Region 1	Region 4	Region 5	Region 6				Region 9
Study, Location-Author, Date of Data	Idaho Gordon 1968	Idaho Gordon 1968		Washington Brown Sorhus Gibbs 1977	Oregon Brown, et al. 1976	Oregon Brown Sorhus Gibbs 1977	Washington Brown Mathews 1967	Crutchfield Schelle 1978
Reported Value/ Activity, Day	17	17		20.92	21.77	17.36	38.75	18.00
Adjustment to 1982	41.70	41.70		30.12	33.62	25.00	99.02	25.92
Adjustment Value of Travel Time	54.21	54.21						
Adjustment for Individual Observation								
Adjustment for Instate Only				34.64	38.66	28.75		
Adjustment Reported Values per Activity Day	54.21	54.21		34.64	77.32	57.50	99.02	25.92
Regional Values per Activity Day	$36	$36			$52			
Regional Values per 12 Hour RVD w/Studies	$36	$36			$52			
Region Values 12 Hour RVD w/out Studies			$50					$60

BIG GAME HUNTING

I. LITERATURE REVIEWED

Region 2

Miller (1980) derived values for deer hunting in Colorado using both individual observation TCM and noniterative open-ended CVM. The study derived separate values for resident and nonresident rifle hunting, resident sportsman hunting, muzzle-loading rifle hunting and archery hunting. The TCM and CVM values reported here are for resident rifle hunting. The sportsman license no longer exists. Muzzle-loading and archery licenses represent a very small portion of total hunting. No TCM values were derived for nonresidents, but resident rifle hunting values were reported. A mail questionnaire was sent in 1974 to a random sample of license holders. The TCM values were adjusted for travel time but not substitutes. The CVM values represent willingness to pay additional costs to get to the hunt area but not additional costs at the hunt site. Values derived are $9.11 and $65.23 for CVM and TCM, respectively. Wilman (1982) estimated a values for deer hunting in the Black Hills that ranged from $35 to $90.

Region 3

The individual observation Travel Cost Method was used by Martin, Gum, and Smith (1974) to derive hunting values in Arizona. They report a value for deer hunting and a value for all other big game hunting. The study adjusted for travel time and substitute sites. Data was collected in 1970 for instate users only. A deer hunting value of $52.85 is reported for a household trip. The average number of days per household trip is 1.9 resulting in a value of $27.82 per household. The average number of people hunting in a household is 1.5 resulting in a value of $18.54 per visitor day.

A value for all other big game hunting is reported as $57.43. The average number of days per household trip is 1.9 resulting in a value of $30.27 per household. The average number of people hunting in a household is 1.5 resulting in a value of $20.15 per visitor day.

Region 4

Loomis (1982) used zonal TCM to derive the value of antelope hunting in Utah. Data was collected in 1979, but only instate users were sampled. The study adjusted for travel time but not substitute sites. A value of $20.77 per trip is reported. Average trip length is 1.5 days resulting in a value of $13.80 per visitor day. The author suggests this value may be an underestimate of the true value since a linear functional form was used.

Hansen (1977) utilized CVM to derive values for deer, antelope, and elk hunting in Region 4. Data was taken from the 1975 U.S. Fish and Wildlife Service Hunting and Fishing Survey. The mail survey format was noniterative, open-ended. Respondents were asked how much more they would be willing to spend before not engaging in the particular hunting activity in question. The following user day values were derived. Deer hunting was valued at $20.55 per visitor day, antelope hunting at $11.70, and elk hunting at $22.63 per visitor day.

Deer hunting in Utah was valued by Wennergren, Fullerton, and Wrigley (1977) using zonal TCM. Data was collected in 1970 from an instate sample. The study did not adjust for travel time or substitutes. The study reports a value of $18.67 per trip. Average trip length is 2 days resulting in a value of $9.34 per visitor day.

Big game hunting in Idaho was valued by Brown and Plummer (1979) using a combination Hedonic-TCM. Data was collected in 1976. The study did not adjust for travel time or substitutes. An average state value of $32.73 per activity day is reported.

Region 6

Brown (1973) measured the value of big game (deer and elk) hunting in Oregon. The study utilized individual observation TCM in a study which adjusted for travel time but not substitute sites. Instate mail sampling was done in 1968 from a list of hunters supplied by the Oregon State Game Commission. A value of $9.20 per visitor day was reported.

The value of big game hunting in western Oregon was measured by Brown and Plummer (1979) by using the Hedonic-TCM. The study did not adjust for travel time or substitute sites. Data was collected in 1976. A value of $38.14 per activity day is reported.

Region 8

Bell (1981) used the Hedonic method to value big game hunting in South-Central Louisiana along the Atchafalaya River Basin. Data was taken from the 1975 U.S. Fish and Wildlife Service Hunting and Fishing Survey and the Atchafalaya Basin users survey. Bell's study did not adjust for travel time or substitute sites. A value of $14.60 per visitor day is reported.

Region 9

Utilizing individual observation TCM, Fisher (1977) measured the value of deer hunting in Pennsylvania. Data was collected in 1975. Fisher's study adjusted for travel time but not substitute sites. A value of $80.00 per visitor day is reported.

National Value

A national average value for deer hunting was derived using CVM from data collected in the 1980 U.S. Fish and Wildlife Service Hunting and Fishing Survey. The iterative personal interview questionnaire asked respondents how much more they would be willing to pay via change in trip costs for the 1980 hunting season. A value of $24.00 per activity day is reported.

II. METHODOLOGICAL ADJUSTMENTS

A. Conversion of study data date to a 1982 base year.

Region 2

Miller's 1974 Colorado values convert to 1982 values of $114.61 and $16.00 for TCM and CVM, respectively.

Region 3

The Arizona value of $20.15 for deer hunting converts to 1982 value of $44.46. The Arizona value of $18.54 for all other big game hunting converts to a 1982 value of $40.91.

Region 4

Loomis' Utah value of $13.80 converts to a 1982 value of $17.11. Converting the regional values derived by Hansen results in the following 1982 values: $33.03 for deer, $18.81 for antelope, and $36.37 for elk. The Utah deer hunting value reported by Wennergren, Fullerton, and Wrigley converts into a 1982 value of $20.61. Brown and Plummer's Idaho big game value converts into a 1982 value of $50.02.

Region 6

The Oregon value of $9.20 becomes $22.49 when converted to a 1982 value. The Oregon value of $38.14 becomes $58.29 when converted to a 1982 value.

Region 8

Converting Bell's Louisiana big game value into a 1982 base results in a value of $23.47.

Region 9

The Pennsylvania deer hunting value becomes $128.59 when converted into a 1982 base.

National

Conversion of $24.00 for the value of deer hunting to a 1982 base results in a value of $37.32.

B. Adjustment for omission of travel time.

Region 4

Wennergren, Fullerton, and Wrigley's Utah deer study needs a 30 percent upward adjustment since the study omitted travel time. This upward adjustment results in a value of $26.79.

Adjustment is also necessary for the Idaho value. A 30 percent upward adjustment results in a value of $65.00.

Region 6

Brown and Plummer's Oregon big game study omitted travel time and, therefore, an upward adjustment of 30 percent is necessary. This adjustment results in a value of $75.78.

Region 8

The Louisiana big game hunting value needs a 30 percent upward adjustment since Bell's study omitted travel time. A value of $30.51 results from this adjustment.

C. Adjustment for individual observations.

In accordance with considerations expressed by the expert panel, no downward adjustment for individual observation TCM should be made in the case of big game. This is due to the belief that the probability of participation in big game hunting does not have a strong inverse relationship to travel costs.

D. Adjustment due to instate sample.

Big game hunting in a given state often draws hunters from neighboring states. Therefore, the panel felt a 15 percent upward adjustment is necessary for studies which were limited to an instate sample.

Region 2

The values reported from Miller's study were those which were derived for resident hunters. Both values need to be adjusted upward by 15 percent. This adjustment results in values of $131.80 and $18.40 for TCM and CVM, respectively.

Region 3

Martin, Gum, and Smith's values are based on an instate sample. Adjusting both values upward by 15 percent results in values of $51.13 and $47.05 for deer hunting and all other hunting, respectively.

Region 4

The Utah antelope study by Loomis was based on an instate sample. A value of $19.68 results when an upward adjustment of 15 percent is made.

The Utah deer study by Wennergren, Fullerton, and Wrigley was based on an instate sample. Upward adjustment of 15 percent results in a value of $30.81.

Region 6

Brown's value of $22.49 needs to be adjusted upward by 15 percent since the value was derived from an instate sample. This adjustment results in a value of $25.86.

III. VALUES FOR REGIONS WITH STUDIES

Region 2

Adjusted values range from $18.40 to $131.80. The value Miller derives using CVM is an underestimate because of the wording of the CVM questionnaire. The questionnaire asks whether the respondent would be willing to pay additional costs to get to the site excluding additional on-site costs. This in and of itself is not too serious, however, the TCM study uses variable costs on and off site to derive a measurement of value. For these reasons, the extreme values in the range are not appropriate.

Big game hunting in Colorado is of fairly high quality as suggested by the variety of big game species which can be hunted, the moderate level of hunter congestion, and the relatively high hunter success ratios. Given these considerations of quality, Wyoming has a much higher quality big game resource while South Dakota, Nebraska, and Kansas have a lower quality resource. Miller's study is also concerned with deer which is of higher quality in Colorado than the other big game species in the state.

The supply of big game species relative to human population is high in Wyoming (although declining), moderate in Colorado and the eastern states in Region 2. Since Colorado falls in the upper end of quality and supply, a value slightly below the midpoint of the range seems appropriate. A value of $65.00 per activity day is suggested. In accordance with Miller's study, this value represents a 12-hour RVD.

Region 3

Adjusted values range from $47.05 to $51.13. This value represents all big game in the state of Arizona. New Mexico has a slightly lower quality of big game hunting but similar scarcity problems when compared to Arizona. For these reasons, a lower midpoint value seems appropriate. A value of $48.00 per activity day is suggested. Martin, Gum, and Smith's study would also indicate this value is appropriate for a 12-hour RVD.

Region 4

Adjusted values range from $18.81 to $65.00. The lower value is for antelope only in the region, while the upper value is for all big game in Idaho. In the region, Idaho and northern Utah possess the highest quality big game hunting as indicated by the wider variety of big game species hunted and wider variety of terrains to hunt in. The supply of the big game resource is larger in the North, but the supply of the resource

relative to hunting population is similar throughout the region. Since quality is higher in Idaho, the upper value is a bit too high, but the lower value is only for antelope and, therefore, much too low. A value of $50.00 is suggested for an activity day and a 12-hour RVD.

Region 6

Adjusted values range from $25.86 to $75.78. The lower value is for the entire state of Oregon, while the upper value is for the western portion of the state. The upper value is for a hedonic-TCM application. Since this variant of TCM is still in its developmental phase, we have less faith in this number than the $25.86. The 25.68 is an underestimate since the demand curve was derived using a 220 mile radius cut off. The upper value is for only one portion of Oregon does not represent the entire region. For these reasons a value below the midpoint is appropriate. A value of $48.00 is suggested for an activity day and a 12-hour RVD.

Region 8

The adjusted value for the region is $30.51. This value is for south central Louisiana where big game hunting is poor. Except for isolated pockets (Edwards Plateau, Great Smoky Mountains, and the Appalachian Mountain) big game hunting in Region 8 is very poor as suggested by the very limited big game species hunted. Scarcity is a major problem in the South, although poor quality is probably the more dominant concern. Bell's value is low for the entire region since quality is better, overall, outside of south central Louisiana. A value of $40.00 per activity day is appropriate for the region and also appropriate for a 12-hour RVD.

Region 9

At first glance this value seems extremely high, but for what it measures and where it measures it, the value is reasonable. Pennsylvania has a higher annual harvest of deer than any other state in the United States. The climate, vegetation, and terrain make Pennsylvania an ideal area for high quality deer habitat and, therefore, high quality deer hunting. Quality of deer hunting in the rest of the region is not as good, even though the great lakes states have some exceptional deer hunting. Outside of deer and limited black bear hunting, Region 9 does not have a large variety of big game hunting. Scarcity is a pronounced problem in portions of the Region, but not a major problem overall. Since Fisher's value is for deer only and in a high quality area, a vast downward adjustment does not seem unreasonable. A value of $60.00 per activity day and 12-hour RVD is suggested.

IV. VALUES FOR REGIONS WITHOUT STUDIES

Region 1

Big game hunting quality in the far west of this region is comparable to Idaho, however, as you move east, the quality and variety of big game species deteriorates. The supply of big game relative to the hunting population is high, higher than Region 4. Since quality and scarcity are similar for Region 1 and Region 4, a value equal to that of Region 4 seems appropriate. A value of $50.00 is suggested for a 12-hour RVD.

Region 5

The northern portion of Region 5 has good hunting but not much variety. As one moves south big game hunting becomes almost nonexistent due both to quality and scarcity problems. Since California once upon a time possessed high quality and diversity in the big game resource, scarcity seems the more dominant factor. Region 3 has the most similar quality and scarcity factors, with a quality a little better and scarcity a little less. These two factors cancel and leave Region 3 and 5 with a similar value. A value of $48.00 per 12-hour RVD is suggested.

BIG GAME HUNTING	Region 1	Region 2		Region 3			Region 4					Region 5	Region 6		Region 8	Region 9	National
Study location-author-date of data-species		Colo. Miller 1974 TCM deer	Colo. Miller 1974 CVM deer	Ariz. Martin Gum Smith 1970 deer	Ariz. Martin Gum Smith 1970 other	Utah Loomis 1979 antelope	Region Hansen 1975 deer	Region Hansen 1975 antelope	Region Hansen 1975 elk	Utah Wenner-gren Fullerton Wrigley 1970 deer	Idaho Brown Plummer 1976		Oreg. Brown 1968	Oreg. Brown Plummer 1976	Louis. Bell 1975	Penn. Fisher 1975 deer	U.S.F.W.S. 1980 deer
Reported Value/ Activity Day		65.23	9.11	20.15	18.54	13.80	20.55	11.70	22.63	9.34	32.73		9.20	38.14	14.60	80.00	24.00
Adjustment to 1982		114.61	16.00	44.46	40.91	17.11	33.03	18.81	36.37	20.61	50.02		22.49	58.29	23.47	128.59	27.32
Adjustment to Include Value of Travel Time										26.79	65.00			75.78	30.51		
Adjustment for Individual Observation																	
Adjustment for Instate Only		131.80	18.40	51.13	47.05	19.68				30.81			25.86				
Adjusted Reported Values/Activity Day	None	131.80	18.40	51.13	47.05	19.68	33.03	18.81	36.37	30.81	65.00	None	25.86	75.78	30.51	128.59	
Regional Values per activity day			65.00		48.00				50.00					48.00	40.00	60.00	
Regional Values/12-hour RVD (with studies)			65.00		48.00				50.00					48.00	40.00	60.00	
Regional Values/12-hour RVD (without studies)	50.00											48.00					

CAMPING

I. LITERATURE REVIEWED

Region 2

There are two sets of studies for camping in National Forests in Colorado. The first is by Walsh, Aukerman, and Milton (1980). They found a value of $13.72 for camping in undeveloped sites near or adjacent to high mountain reservoirs. They found an average value of $10.90 per day for camping at developed sites near or adjacent to high mountain reservoirs. Both of these studies used a noniterative open-ended Contingent Value Method approach during on-site interviews. The second Colorado study was by Walsh and Olyienk (1981) on the "Front Range" of Colorado. Using an on-site survey and an iterative Contingent Value Method they found the value per day of developed camping to be $5.59 and for semi-developed camping to be $7.99 or $8 per day.

Region 3

Martin, Gum, and Smith estimated the value of general outdoor recreation. One of the activities in this category was camping as evidenced by an average stay of 1.4 days. Using an individual observation Travel Cost Method, they found a value of $66.54 per household trip. Dividing by 1.4 days and 3.4 persons per household trip, the value per person per activity day is $14. Their study adjusted for travel time.

Ward's study on recreation in southeastern New Mexico included sites in which there is developed camping. Using the individual observation Travel Cost Method, Ward found an average value of $11.39 per visitor day. His study adjusted for the value of time.

Region 4

Michaleson (1977) estimated the value of camping associated with river recreation in Idaho using the individual observation Travel Cost Method. He found an average value of $9 per day. In another study Michaleson and Gilmour (1978) estimated that outdoor recreation in Sawtooth Valley in Idaho. Camping is the predominant activity (77 percent respondents). They used an individual observation Travel Cost Method. They also adjusted for travel time. The data was collected in 1971 from on-site interviews. They found a value of $3.73 per visitor day.

Region 6

Sutherland found an average value of $4.23 per visitor day for Oregon and Washington. This was estimated using a zonal Travel Cost Method. He did not adjust for travel time. The study adjusted for substitutes. Brown and Plummer estimated the value of camping in western Washington at $5.83 per day using a hedonic Travel Cost Method. They did not adjust for travel time. The data refelects on-site registration.

Region 8

Gibbs (1974) used an unusual variant of the individual observation Travel Cost Method to estimate the value of camping associated with river and lake recreation. Gibb's approach was to look at variations in on-site time as a function of cost per day. His value per trip was $21.62. The average length of trip was about two days. Thus, an average value of $10.81 per visitor day. The study did not adjust for travel time.

Region 9

Kalter and Gosse estimated the value of camping in New York using a zonal Travel Cost Method. The estimated value of $6.50 is a statewide average (their Tables 18 and 19). Their study did not adjust for travel time, however.

II. METHODOLOGICAL ADJUSTMENTS

A. Updating to 1982 Base Year

Updating the Walsh et al. (1980) and Walsh-Olyienk (1981) studies to 1982 gives values of $12.41-$15.64 and $5.80-$8.30, respectively. Updating the Martin, Gum, and Smith values from 1970 to 1982 yields values of $30.80. Updating the Ward study yields a value of $15.32. Updating the two Idaho studies by Michaleson and Michaleson-Gilmour results in a value of $18.93 and $7.91, respectively. Updating the Sutherland and Brown-Plummer values to 1982 yields values of $4.81 and $8.75, respectively. Updating the Gibbs study results in a value of $20.65 per day. Updating the Kalter and Gosse study from 1970 to 1982 results in a value of $14.30 per day.

B. Adjusting for Omission of Travel Time

All of the TCM studies in Regions 6, 8, and 9 omitted travel time. Making the 30 percent correction for such omissions yields values of $6.25 for Sutherland, $11.40 for Brown and Plummer, $31 for Gibbs, and $18.60 for Kalter and Gosse.

C. Adjusting for Individual Observation TCM

As discussed in the introduction, values derived from individual observation TCM need to be adjusted downward slightly to make them consistent with values derived from zonal TCM. Doing this to the Martin, Gum, and Smith; Michaleson; Michaleson-Gilmour; Ward (1978); and Gibbs (1974) studies results in values of $26.18, $16, $6.70, $13, and $26.35, respectively.

D. Adjusting for Instate Sample

The Martin, Gum, and Smith values were derived from a sample restricted to instate users. While this will tend to understate the value, since camping is a regionalized activity, we will be conservative and not adjust their value upward. However, in Ward's study the survey was restricted to New Mexico counties near or adjacent to the sites under study. This is a much more serious sample restriction and here some upward adjustment is necessary. Making this adjustment yields a value of $15.

III. VALUES FOR REGIONS WITH STUDIES

Region 2

The ranges of value for camping goes from $5.80-$8.30 for camping at varied types of sites along the Front Range to $12.41-$15.64 for camping by high mountain reservoirs. The $8.30 value is probably more typical of the values at campsites not near water. To get a generalized value for Colorado, an average of the $8.30 and the low value for high mountain reservoirs ($12.41) will be used. This results in a value of about $10 a day.

BIG GAME HUNTING

Study location-author-date of data-species	Region 1	Region 2		Region 3			Region 4					Region 5	Region 6	Region 8	Region 9	National
	So. Dakota Wilson 1982	Colo. Miller 1974 YGH deer	Colo. Miller 1974 CVH deer	Ariz. Martin Gum Smith 1970 deer	Ariz. Martin Gum Smith 1970 other	Utah Loomis 1979 antelope	Region Hansen 1975 deer	Region Hansen 1975 antelope	Region Hansen 1975 elk	Utah Wenner-gren Fullerton Wrigely 1970 deer	Idaho Brown Plummer 1976		Oreg. Brown 1968	Oreg. Brown Plummer 1976	Louis. Bell 1975	Penn. Fisher 1975 deer	U.S.F.W.S. 1980 deer
Reported Value/ Activity Day	35-90	65.23	9.11	20.15	18.54	13.80	20.55	11.70	22.63	9.43	32.73		9.20	38.14	14.60	80.00	24.00
Adjustment to 1982	35-90	114.61	16.00	44.46	40.91	17.11	33.03	18.81	36.37	20.61	50.02		22.49	58.29	23.47	128.59	27.32
Adjustment to Include Value of Travel Time										26.79	65.00			75.78	30.51		
Adjustment for Individual Observation																	
Adjustment for Instate Only	35-90	131.90	18.40	51.13	47.05	19.68				30.81			25.69				
Adjusted Reported Values/Activity Day	None 35-90	131.80	18.40	51.13	47.05	19.68	33.03	18.81	36.37	30.81	65.00	None	25.86	75.78	30.51	128.59	
Regional Values per activity day		65.00		48.00			50.00						48.00		40.00	60.00	
Regional Values/12-hour RVD (with studies)		65.00		48.00			50.00						48.00		40.00	60.00	
Regional Values/12-hour RVD (without studies)	50.00											48.00					

This value would seem appropriate for Wyoming and South Dakota as well. While population and lack of supply would tend to push the value higher in Kansas and Nebraska, the lower quality would imply a lower value. Thus, $10 will be recommended as the value per activity day and RVD since a camping day takes a majority of a typical day.

Region 3

The $26 value for Martin, Gum, and Smith represents a statewide average value for Arizona. The $15 adjusted value from Ward's study reflects camping at remote southeastern New Mexico reservoirs. We would expect the Arizona value to be higher since population levels are higher and the study sites are located much closer to population centers in Arizona than they are in New Mexico. Thus, the New Mexico value is too low as a state average. A value closer to $20 would be appropriate. However, to be conservative and consistent with the values in Region 2, a value of $15 will be recommended per activity day in Region 3. Since camping is the type of activity that takes a majority of the day, this will be the value recommended per RVD.

Region 4

The range of values from the Michaleson and Michaleson-Gilmour studies is $16 to $6.70. Like the pattern in Region 2, the camping value associated with water is higher than just general camping. Since water is generally quite scarce in Region 4, camping values closer to the $6.70 end of the range would seem appropriate. Given the low population levels and abundant supply, a value around $8 seems reasonable for a recommended value per RVD.

Region 5

Region 5 has some characteristics similar to western regions such as 2 and 6 as well as eastern Region 9. The high population levels and high quality of the resource implies a value near that of Region 9. However, there is a great deal of public land in Region 5 implying a value closer to Regions 2 and 6. Therefore, a value of $12 per RVD would seem to capture the demand and supply forces represented in Region 5. Thus, $12 per RVD is recommended as the value per RVD.

CAMPING	Region 1	Region 2		Region 3		Region 4		Region 5	Region 6	Region 8	Region 9
Study Location		Colorado	Colorado	Arizona	New Mexico	Idaho	Idaho	Oregon	Wash.	Florida	New York
Author		Walsh &	Walsh	Martin	Ward	Michaleson	Michaleson	Wash.	Brown &	Gibbs	Kalter &
Date of Data		Olyniek	et al.	Gum &			& Gilmour	Sutherland	Plummer		Gosse
		1981	(1980)	Smith (1970)	(1978)	(1971)	(1971)	(1980)	(1976)	(1970)	(1970)
Reported Value/ Activity Day		5.59-8.00	10.90-13.72	14.00	11.39	9.00	3.73	4.23	5.83	10.81	6.50
Adjustment to 1982		5.80-8.30	12.41-15.64	30.80	15.32	18.93	7.91	4.81	8.75	23.78	14.30
Adjustment for Value of Travel Time								6.25	11.40	31.00	18.60
Adjustment for Individual Observation				26.18	13.00	16.00	6.70			26.35	
Adjustment for Instate Only					15.00						
Adjustment of Reported Values per Activity Day		5.80-8.30	12.41-15.64	26.00-15.00		16.00-6.70		6.25	11.40	26.36	18.60
Adjustment of Reported Values per Activity Day			10.00		15.00		8.00				
Regional Values per 12-hour RVD w/studies			10.00		15.00		8.00		9.00	16.00	17.00
Regional Values per 12-hour RVD w/out Studies	8.00							12.00			

DOWNHILL SKIING

I. LITERATURE REVIEWED

Region 2

Only one study dealt with the value of downhill skiing. Walsh (1982) utilized the Contingent Valuation Method to derive a value estimation for downhill skiing at the Colorado areas of Vail, Copper Mountain, and Loveland Basin. Willingness to pay additional money over and above current trip costs was the payment vehicle used. Data was collected in 1980 utilizing an iterative, in person survey. A value of $24.30 is reported. The study also reports that an average day of skiing at these areas is 5 hours. Therefore, all values will be doubled in order to report on a 12-hour RVD. This 12-hour RVD value reports, a value which allows for 2 separate visits. Since the Forest Service counts two lift tickets per a 12-hour RVD in this region, this adjustment is further justified.

II. METHODOLOGICAL ADJUSTMENTS

A. Conversion of study data date to a 1982 base year.

Walsh's 1979 value of $24.30 converts to a 1982 value of $30.13. No other adjustments are necessary.

III. VALUES FOR REGIONS WITH STUDIES

Region 2

The value reported by Walsh (1982) are for areas of very high quality downhill skiing. Use is great but not to the point of great congestion. Region 2 also includes South Dakota, Wyoming, Kansas, and Nebraska which do not have high quality areas and also have a small supply relative to population resulting in a fairly scarce resource. The value of $30.13 represents a part of Region 2 which is of high quality and moderate scarcity. Therefore, a downward adjusted value of $27.00 is recommended for the region as a whole. This value reflects the lower quality found in the other states.

The value of $27.00 represents half of a 12-hour RVD and, therefore, must be doubled to reflect a full 12-hour RVD. The 12-hour RVD value is $54.00.

IV VALUES FOR REGIONS WITHOUT STUDIES

Region 1

This region does not have the quality of downhill skiing that is found in Region 2. Much of Region 1 is sparsely populated indicating a high supply relative to the population and, therefore, scarcity is not a problem. For these reasons, a value much lower than that of Region 2 is appropriate. A value of $24.00 is suggested.

In accordance with the procedure described above, the value of $24.00 should be doubled for a 12-hour RVD. The 12-hour RVD value is $48.00.

Region 3

The quality of downhill skiing in Region 3 is very poor. The resource is also very scarce due to the small supply relative to the population. Poor quality seems to be the dominant factor in this region suggesting a value lower than that in Region 2. A value of $25.00 seems appropriate.

On a 12-hour RVD, this value is doubled, resulting in a value of $50.00.

Region 4

This region has some very high quality downhill ski areas, comparable in some cases to those areas found in Colorado. However, as with Region 2, some states in Region 4 have a lower quality resource than those areas found in western Wyoming and eastern Utah. Scarcity in Region 4 is similar to that in Region 2. Since the resource setting and supply is nearly identical in both regions, the value of $27.00 for Region 2 also seems appropriate for Region 4.

Conversion to a 12-hour RVD results in a value of $54.00.

Region 5

Scarcity seems to be the dominant factor in California downhill ski areas. While quality is moderate throughout most of California, the supply relative to population is very low. Due to the scarcity considerations, a value of $28.00 is suggested. This value considers both the higher quality found in northeast California and the great scarcity over the entire state.

The 12-hour RVD value is $56.00.

Region 6

Although some high quality areas do exist in Region 6, for the most part, downhill skiing is of moderate quality. Scarcity is not a major problem, although it is more of a problem than in Region 2. Quality is higher and scarcity is greater in Region 6 than in Region 1, therefore, the value for Region 6 should be greater than the value suggested for Region 1. The value should, however, be lower than that of Region 4 since Region 4 has higher quality. A value of $25.00 is suggested.

Consistent with the procedure followed above, results in a 12-hour RVD value of $50.00.

Region 8

Downhill skiing is almost nonexistent in Region 8 with very limited areas in Virginia and North Carolina. Needless-to-say, these few areas are of very poor quality. Although supply is very minimal relative to population, poor quality is the dominant factor with some weight given to scarcity. Since Region 3 has better quality ski areas and similar scarcity problems, a value for Region 8 which is slightly lower than Region 3 is appropriate. A value of $23.00 is recommended.

On a 12-hour RVD basis, the value is $46.00.

Region 9

High quality ski areas can be found throughout the entire northern portion of this region. The quality is not nearly as great as Colorado, however, Vermont and New Hampshire do possess some exceptional areas. The biggest factor lies in the scarcity problem. Supply of ski areas in

Region 9 does not come close to satisfying population demands. Lower quality relative to Region 2 and greater scarcity relative to Region 2 would seem to cancel out and leave Region 9 with the same value as Region 2. The scarcity factor seems to be slightly more dominant, therefore, a value of $28.00 is suggested.

Conversion to a 12-hour RVD results in a value of $56.00.

DOWNHILL SKIING	Region 1	Region 2	Region 3	Region 4	Region 5	Region 6	Region 8	Region 9
Activity Location		Colo.						
Author		Walsh						
Date of Data		1979						
Reported Value/ Activity Day		24.30						
Adjustment to 1982		30.13						
Adjustment to Include Value of Travel Time								
Adjustment for Individual Observation								
Adjustment for Instate Only								
Adjusted Reported Values/Activity Day	None	30.13	None	None	None	None	None	None
Regional Values per Activity Day		27.00						
Regional Values/12-hour RVD (with studies)		54.00						
Regional Values/12-hour RVD (without studies)	48.00		50.00	54.00	56.00	50.00	46.00	56.00

FISHING, COLD WATER

I. LITERATURE REVIEWED

Region 2

Three separate studies in Colorado utilized the Contingent Value Method to measure the value of coldwater fishing. The first study by Walsh, Aukerman, and Milton (1980) utilized an in-person, noniterative, open-ended questionnaire which asked willingness to pay additional trip costs. Data for this study was collected in 1978. The study reports a value of $10.90 per activity day.

The second Colorado CVM study was done by Walsh, Ericson, Arosteguy, and Hansen (1980). The questionnaire format was an in-person, noniterative, open-ended willingness to pay additional trip costs survey. Data was collected in 1980. A value of $10.53 per activity day was reported.

The last Colorado CVM study was done by Walsh and Olienyk (1981). This study differs from the others in that the in-person survey was used in an iterative format. As with the others, the payment vehicle was willingness to pay additional trip costs. Data was collected in 1980. A value of $8.94 is reported for a 4.6 hour day. On a 12-hour basis, this value is $23.32.

Region 3

The first study in this region is an individual observation travel cost by King and Walka (1980). Data was collected in 1980 on the Fort Apache Indian Reservation, Arizona. The study does not adjust for substitutes, but it does adjust for travel time. Updated values (personal communication) are $221 per party trip. There were an average of 4.17 anglers per party resulting in a value of $53 per angler trip. A trip lasts an average of 5.8 days resulting in a value of $9.30 per angler day.

Individual observation TCM was also used by Martin, Gum, and Smith (1974) to derive a value for cold water fishing in Arizona. Data was collected in 1970. The study adjusted for substitutes and travel time. A value of $50.13 per household trip is reported. The average days per household trip is 1.9 resulting in a value of $26.38 per household per day. Average people per household trip is 2.6 resulting in a value of $10.15 per activity day.

Region 4

A regionwide average value was derived by Hansen (1977) utilized the Contingent Value Method. Data was obtained from the 1975 U.S. Fish and Wildlife Service Hunting and Fishing Survey. This mail survey utilized the noniterative open-ended format. Respondents were asked willingness to spend before not engaging in cold water fishing. The study reports a value of $9.76 per activity day.

Gordon (1968) estimates the value of Idaho cold water fishing using the Zonal Travel Cost Method. Data was collected in 1968. The study did not adjust for substitutes or travel time. Gordon reports a value of $3.65 per visitor day for cold water fishing on Idaho's high country lakes.

The U.S. Fish and Wildlife 1980 Hunting and Fishing Survey derived a value for trout fishing in Idaho. This personal interview utilized an iterative Contingent Valuation Method format. Respondents were asked willingness to pay additional trip costs during the 1980 hunting and fishing season. A value of $12.93 was derived for Idaho trout fishing.

Region 6

Brown and Plummer (1979) used Hedonic-Travel Cost Method to derive a value for cold water fishing in Washington and Oregon. Data was collected in 1976. The study does not adjust for substitutes or travel time. Values of $19.00 and 34.00 per visitor day are reported for Western Washington.

Region 8

A value for cold water fishing in Kentucky was derived by Bianchi (1969) using the zonal Travel Cost Method. Fishermen were approached during the 1969 fishing season while they were engaged in fishing and given a survey to complete and return by mail. The study adjusted for travel time and substitutes within the state. A 150 mile zonal cut-off was used when deriving the demand curve. The study reports a value of $3.51 per activity day.

Region 9

Both studies in this region derived values for coldwater fishing by utilizing the Zonal Travel Cost Method. This first study by Weithman and Haas (1982) derived a value for Lake Taneycomo, Missouri. The data was collected in 1979. The study adjusted for travel time but not substitute sites. A value of $15.67 per visitor day is reported. The second zonal TCM study was done by Kalter and Gosse (1969). They derived a value for cold water fishing in New York. Data was collected in 1965. The study did not adjust for travel time or substitute sites. A value of $9.19 per visitor day is reported.

National Values

Vaughan and Russell (1981) used the zonal Travel Cost Method to derive a national value for trout fishing. Data was collected in 1979 using State Game and Fish fishing license lists. The study adjusted for travel time and substitutes. When deriving the demand curved 200 mile radius was used as the cutoff. A value of $19.49 per activity day is reported.

The U.S. Fish and Wildlife 1980 Hunting and Fishing Survey derived a national value for trout fishing. This personal interview utilized an iterative Contingent Valuation Method format. Respondents were asked willingness to pay additional trip costs during the 1980 hunting and fishing season. A national value of $14.50 is reported.

These values will serve as a starting point when deriving regional values for regions without studies.

II. METHODOLOGICAL ADJUSTMENT

A. Conversion of study data date to a 1982 base year.

Region 2

Converting the Colorado studies to a 1982 base results in values of $12.41, $11.99, and $24.30.

Region 3

King and Walka's study data value of $9.30 converts to a 1982 value of $10.59. Martin, Smith, and Gum's value of $10.15 converts to a 1982 value of $22.39.

Region 4

Hansen's region-wide value of $9.76 converts to a 1982 value of $15.69. The Idaho value of $3.65 converts to a 1982 value of $8.98. The U.S. Fish and Wildlife Service value of $12.93 converts to a 1982 value of $14.72.

Region 6

Converting Brown and Plummer's study value to a 1982 base results in a value of $40.50.

Region 8

Bianchi's Kentucky cold water fishing value of $3.51 converts to a 1982 value of $8.58.

Region 9

The missouri value by Weithman and Haas becomes $19.43 on a 1982 base. Kalter and Gosse's New York value converts to a 1982 value of $24.94.

National Values

Vaughan's national value of $19.49 converts to a 1982 value of $24.17.

The U.S. Fish and Wildlife Service value of $14.50 converts to a 1982 value of $16.50.

B. Adjustment due to omission of travel time.

Region 4

Travel time was omitted from Gordon's Idaho study. As discussed in the introduction, an upward adjustment of 30 percent will be made. Adjusting the value of $8.98 upward by 30 percent results in a value of $11.57.

Region 6

Brown and Plummer did not adjust for travel time in their Washington/Oregon cold water fishing study. An upward adjustment of 30 percent results in values of $37.75 and $67.55 for Washington and Oregon, respectively.

Region 9

A 30 percent upward adjustment is necessary in Kalter and Gosse's New York study due to the omission of travel time. This adjustment results in a value of $32.42.

C. Adjustment for individual observations.

The panel decided no adjustment is necessary for individual observation TCM since the probability of participation in cold water fishing does not exhibit a strong inverse relationship to travel costs.

D. Adjustment due to instate sample.

In accordance with the criteria of the panel, cold water fishing is considered to be a regional or multistate activity in some areas of the U.S.

Therefore, an upward adjustment of 15 percent will be made for studies which did not sample nonresidents.

Region 3

Martin, Gum, and Smith's study was limited to instate users only, therefore, an upward adjustment of 15 percent is advised. This results in a value of $25.75.

Region 9

The New York study by Kalter and Gosse needs a 15 percent upward adjustment due to the instate sample. This results in a value of $37.28.

III. VALUES FOR REGIONS WITH STUDIES

Region 2

Adjusted values range from $11.99 to $24.30. Since all of the studies for this region were in Colorado, the range needs to be adjusted for other areas within the region. Both Wyoming and Colorado have high quality cold water fishing although Wyoming's is slightly better. The eastern states in the region have some cold water fishing but not of the high quality found in Colorado or Wyoming. The other states in the region have a more pronounced scarcity problem. Given these considerations, a value in the middle of the range seems appropriate. A value of $18.00 is suggested. In accordance with the design of the studies, this value represents a 12-hour RVD.

Region 3

Adjusted values range from $10.59 to $25.75. Both studies are from Arizona, although the value of $25.75 is a state-wide average and the value of $10.59 is for a specific site in Southeastern Arizona. New Mexico has a similar cold water fishing resource as Arizona, however, the quality is slightly less. Scarcity is of the same magnitude for both states, therefore, no adjustment is necessary between states. Since quality is a little better in Arizona, the upper value in the range is not appropriate for the whole region. A value of $22.00 per activity day is suggested. The studies indicate this value is appropriate for a 12-hour RVD.

Region 4

Adjusted values range from $11.57 to $15.69. The U.S.F.W.S. value of 14.72 represent average for the entire state of Idaho while the lower value is for one specific area in Idaho. Hansen's regionwide value of 15.69 starts to capture many of the quality and scarcity problems found in other states in the region. However, scarcity of cold water fishing in Utah and Nevada calls for adjusting the regional value upwards. A value of $17.00 per activity day is suggested for the region. This value represents a 12-hour RVD.

Region 6

Brown and Plummer's adjusted values range from $37.75 to $67.55. These values are for western Oregon and western Washington which have much higher population levels and greater cold water fishing quality than the eastern portion of the states. The supply of cold water fishing relative to human populations is fairly high indicating scarcity is not a strong factor. For these reasons, Brown and Plummer's values should be adjusted downwards. A value of $24.00 per activity day would be conservative. This value reflects a high quality resource; a high quality which is found over the entire region. The design of the study suggests this value be used for a 12-hour RVD.

Region 8

The adjusted value for the region is $8.58. Theoretically, this value is too low since Bianchi used a 150 mile radius cutoff when deriving the demand curve. Cold water fishing is almost nonexistent in this

region, and what little is found is of poor quality. The Appalachian Mountains have some higher quality cold water fishing; at least better than the Kentucky value reported. The northeast portion of the region has less of a scarcity problem relative to the deep south and therefore, the Kentucky value does not reflect the overall scarcity problem of the region. To account for the 150 mile radius cutoff, the higher quality in the Appalachian Mountain and the greater scarcity in the deep South, the Kentucky value needs to be adjusted upward to reflect a regionwide value. A value of $13.00 per activity day is suggested. This value is also suggested for a 12-hour RVD.

Region 9

Adjusted values range from $19.43 to $37.28. The lower value is for cold water fishing in Missouri and the upper value is for New York. With the abundance of lakes and rivers, the northern portion of this region has excellent cold water fishing. The southern portion does not have very high quality indicating the Missouri value is too low for the region as a whole. Over the entire region, there is a high supply of cold water fishing relative to the human population. Scarcity is more of a problem in the East indicating New York's value is too high for the region as a whole. Since the values for Missouri and New York represent the quality and scarcity problems of the region, a midpoint seems appropriate. However, a value below this seems more appropriate since the scarcity problem is the most pronounced in New York whereas the poor quality is not most pronounced in Missouri. A value of $24.00 is suggested for an activity day and a 12-hour RVD.

IV. VALUES FOR REGIONS WITHOUT STUDIES

Region 1

Montana possesses some very high quality cold water fishing, however, North Dakota's quality is not as good. As a whole, the region is probably comparable with the national average. Since this region has a large supply relative to the population, a lower bound to the national average seems appropriate. A value of $17.00 is suggested for a 12-hour RVD.

Region 5

The northern part of California contains some high quality cold water fishing but as one moves South the quality deteriorates. Quality overall is probably worse than the national average. Scarcity is a major factor in California since supply relative to human population is very low. A value of $19.00 is suggested to reflect that scarcity is a more dominant factor than poor quality.

COLD WATER FISHING	Region 1	Region 2		Region 3			Region 4		Region 5	Region 6	Region 8	Region 9	National		
Study Location-Author-Date of Data		Colo. Walsh Auker. Milton 1980	Colo. Walsh Eric. Arost. Hansen 1980	Colo. Walsh Olien. 1981	Ariz. King Walka 1980	Ariz. Martin Gum Smith 1970	Region Hansen 1975	Idaho Gordon 1968	Idaho USF&WS 1980	Wash. Brown Plummer 1976	Oreg. Brown Plummer 1976	Ky. Bian. 1968	Mo. Weith. Haas 1979	N.Y. Kalter Gosse 1965	Vaughan Russell 1979	USF&WS 1980
Reported Value/ Activity Day		10.90	10.53	23.32	9.30	10.15	9.76	3.65	12.93	19.00	34.00	3.51	15.67	9.19	19.49	14.50
Adjustment to 1982		12.41	11.99	24.30	10.59	22.39	15.69	8.14	14.72	29.04	51.96	8.58	19.43	24.94	24.17	16.50
Adjustment to Include Value of Travel Time								11.57		37.75	67.55			34.42		
Adjustment for Individual Observation																
Adjustment for Instate Only						25.75								37.28		
Adjusted Reported Values/ Activity Day	None	12.41	11.99	24.30	10.59	25.75	15.69	11.57	14.72	None 37.75	67.55	8.58	19.43	37.28	24.17	16.50
Regional Values per Activity Day			18.00			22.00		17.00			24.00	13.00		24.00		
Regional Values/12-hour RVD (with studies)			18.00			22.00		17.00			24.00	13.00		24.00		
Regional Values/12-hour RVD (without studies)	17.00								19.00							

FISHING, WARM WATER (FRESH)

I. LITERATURE REVIEWED

Region 3

Martin, Gum, and Smith (1974) utilized the individual observation Travel Cost Method to derive the recreational value of warm water fishing in Arizona. Sampling in 1970 was restricted to instate users only. Adjustments were made for travel time and substitutes. The study derived an average Arizona value of $45.92 per household trip. The average number of days per household trip is 1.6 resulting in a value of $28.70. The average number of people per household trip is 2.3 resulting in a visitor day value of $12.48.

Region 8

The individual observation Travel Cost Model was used by Ziemer, Musser, and Hill (1980) for valuation of Georgia warm water fishing. The 1972 data was restricted to instate sampling. The study adjusted for travel time but not substitute sites. A value of $26.46 per trip is reported. Average trip length is 2 days resulting in a value of $13.23 per visitor day.

A second study was in Florida and used a variation of individual observation TCM. This TCM study implemented by Gibbs (1974) was unusual in that it used cost per day on site as the price variable. Data was collected in 1970. The study did not adjust for travel time or substitutes. Warm water fishing is valued at $21.62 per trip. Average trip length is 2 days indicating a value of $10.81 per visitor day.

Warm water fishing was valued in south central Louisiana by Bell (1980) using the Hedonic Method. This study adjusted for travel time and substitutes. Data was obtained in 1975 from the 1975 National Survey of Hunting and Fishing and The Atchafalaya Basin Users Survey. A value of $15.98 per visitor day is reported.

Vaughan and Russell (1981) derive a national value for warm water fishing using the individual observation TCM. Data was collected in 1971. The study adjusted for both travel time and substitutes. A national value of $14.09 was derived for warm water fishing. This value will prove to be a useful reference point in regions without specific studies.

II. METHODOLOGICAL ADJUSTMENTS

A. Conversion of study data date to a 1982 base year.

Region 3

The Arizona warm water fishing value derived in 1970 converts to a 1982 value of $27.54.

Region 8

Gibb's Florida value of $10.81 converts to a 1982 value of $20.78.

Conversion of the value in Georgia of $13.23 results in $26.71 in 1982.

Louisiana's warm water fishing value is $25.69 when converted to 1982 dollars.

The national value of $14.09 as reported in 1979 converts to $17.47 in 1982 dollars.

B. Adjustment for omission of travel time.

Region 8

Gibb's Florida TCM study is the only study in which this adjustment is necessary. Adjusting the value of $23.78 upward by 30 percent results in a value of $30.00.

C. Adjustment for individual observations.

The panel advised a slight downward adjustment of 15 percent for warm water fishing studies utilizing individual observation TCM. It was felt that this activity has a slight inverse relationship between the probability of participation and travel cost.

Region 3

Adjusting the Arizona value downward by 15 percent results in a value of $23.41.

Region 8

The Georgia value of $26.71 when adjusted downward by 15 percent results in a value of $22.70.

Gibb's study also utilized individual observation TCM. Downward adjustment by 15 percent results in a value of $26.35.

The national warm water fishing value derived by Vaughan also needs a 15 percent downward adjustment. This adjustment results in a value of $14.85.

D. Adjustment due to instate sample.

Since warm water fishing is a localized activity, Martin, Gum, and Smith's study value, which is derived from instate samples, does not need to be adjusted upward by 15 percent.

III. VALUES FOR REGIONS WITH STUDIES

Region 3

The adjusted value for Martin, Gum, and Smith's study is $23.41. This value is an Arizona statewide average. New Mexico is also in Region 3 and, therefore, adjustment needs to be made to take this into account. The quality of warm water fishing is much higher in Arizona compared to New Mexico indicating the value should be adjusted downward. The value should not be adjusted too far down because scarcity is more of a problem in Arizona. A value of $20.00 is suggested. In accordance with Martin, Gum, and Smith's study, this value represents a 12-hour day.

Region 8

Adjusted values range from $22.70 to $26.35. Each of the three studies represents a different state in Region 8 and, therefore, fairly representative of the entire region. It seems logical then to use the midpoint value of the range as the appropriate value for the region. A value of $24.00 is suggested. This value is also suggested for a 12-hour RVD.

IV. VALUES FOR REGIONS WITHOUT STUDIES

The national value derived by Vaughan (1979) will be used as a reference point. The adjusted national value is $14.85. More importantly, however, values from Region 3 and Region 8 will be used as they apply to adjacent regions.

Region 9

The southern portion of Region 9 possesses some high quality warm water fishing, although not of the quality found in Region 8. Scarcity is a stronger factor in Region 9 since the supply of warm water fishing relative to the population is very low. Looking at the national average, Region 9, on the average, has higher quality than the rest of the nation. A value for Region 9 should be below Region 8 because the low quality is a more prominent factor than the scarcity. On the other end, a value for Region 9 should be well above the national average because quality in Region 9 as compared to the whole country is much higher. A value of $21.00 is suggested for a 12-hour RVD.

Region 2

The eastern portion of Region 2 contains high quality warm water fishing. Unfortunately, the quality of warm water fishing in Colorado and Wyoming is very poor. Scarcity problems are also split in much the same manner. Kansas and Nebraska do not have a scarcity problem as bad as Region 3 although scarcity is a problem. Colorado and Wyoming have a great scarcity, but the quality of the resource is so poor that the small supply relative to the population is overshadowed. Overall, the quality in Region 2 is much below that of Region 3. For these reasons, a value below that of Region 3 and close to the national average is appropriate for Region 2. A value of $16.00 per 12-hour RVD is suggested.

Region 5

California has the terrain, temperatures, and location for a high quality warm water fishing resource. Unfortunately, the quality is very poor at present. The quality of the California resource is much below that of Region 3. Both of these regions have a major scarcity problem, California probably more so because of the greater population numbers. The poor quality, high scarcity seem to cancel each other out, leaving Region 3 and 5 with the same value. Overall, though, the poor quality is more dominant a factor leaving Region 5 with a lower value than Region 3. A value of $18.00 per 12-hour RVD is suggested.

Region 4

The southern two-thirds of Region 4 possesses high quality warm water fishing but not a lot of it. Overall, the region's value is similar to the national average, however, the national average does not reflect the high scarcity of a quality resource. Scarcity and quality in Region 4 does not approach that of Region 3 although it is of a similar magnitude. Most of the warm water fishing is located a great distance from population centers in this region. Thus, a value close to the national average and below Region 3's value seems appropriate. A value of $16.00 is suggested for a 12-hour RVD.

Region 1

Region 1 is split similarly to Region 2, with the eastern portion possessing some high quality warm water fishing, while the western portion has a poor quality resource. Scarcity is less of a problem in Region 1 compared to Region 2. Because of their strong quality similarities and slight scarcity differences, a value for Region 1 should be slightly below the value for Region 2. A 12-hour RVD value of $15.00 is suggested.

FRESH WARM WATER FISHING	Region 1	Region 2	Region 3	Region 4	Region 5	Region 6	Region 8		Region 9	National
Study Location, Author, Date of Data			Ariz. Martin Gum Smith 1970				Louis. Bell 1975	Georgia Ziemer Musser Hill 1972	Florida Gibbs 1970	Vaughan 1979
Reported Value/ Activity Day			12.48				15.98	13.23	10.81	14.09
Adjustment to 1982			27.54				25.69	26.71	23.78	17.47
Adjustment to Include Value of Travel Time									31.00	
Adjustment for Individual Observation			23.41					22.70	26.35	14.85
Adjustment for Instate Only										
Adjusted Reported Values/Activity Day	None	None	23.41	None	None	None	25.69	22.70	26.35	None	14.85
Regional Values per Activity Day			20.00					24.00		
Regional Values/12-hour RVD (with studies)			20.00					24.00		
Regional Values/12-hour RVD (without Studies)	15.00	16.00		16.00	18.00	N/A				21.00

FISHING, SALT WATER

I. LITERATURE REVIEWED

Region 9

The only salt water fishing study found was for flounder fishing in Rhode Island. McConnell (1979) measured recreational salt water fishing values using both the Hedonic Method and the individual observation Travel Cost Method. Data was collected in 1978. The study adjusted for travel time but not substitutes. A value of $30.34 and $67.06 per visitor day was found using TCM and HM, respectively. McConnell identifies a reason for the higher value associated with the Hedonic Method. The quality variable is complementary to trips; however, leaving out either of these variables results in a strong downward bias in the results. The Travel Cost Model does not contain a quality variable and as a result, this measure is an underestimate.

II. METHODOLOGICAL ADJUSTMENTS

A. Conversion of study data date to a 1982 base year.

Region 9

The values for salt water fishing in Rhode Island convert to 1982 values of $40.81 and $90.19 for TCM and HM, respectively.

B. Adjustment for individual observations.

The panel concurred that in the case of salt water fishing, the probability of participation does not have a strong inverse related to travel cost and, therefore, no adjustment is necessary.

III. VALUES FOR REGIONS WITH STUDIES

Region 9

Adjusted values for Region 9 range from $40.81 to $90.00. Since the same study derived two values, a midpoint value from that study would be appropriate for the study area in question. McConnell feels the Travel Cost Value is an underestimate; giving further reason for a midpoint value. This value is $65.04. Now this single value for Rhode Island can be adjusted to apply to the entire region.

Region 9 does not have a wide variety of salt water fish species, but much of the fishing is of very high quality. Diversity over the region as compared to Rhode Island is about the same although the Delaware shore is slightly more diverse, but the Maine shore is slightly less diverse for salt water fishing. Scarcity over the region is also similar to Rhode Island. The southern portion of the region may have less supply in relation to human population. This averages out since the northern portion has a larger supply relative to human populations. A value of $55.00 is suggested as a result of Rhode Island being fairly representative of the region. According to the design of McConnell's study, this value also represents a 12-hour RVD.

IV. VALUES FOR REGIONS WITHOUT STUDIES

Region 8

The diversity of fish species in Region 8 is higher than in Region 9. The southeast portion has a very diverse number of fish species; however, the south central portion is diversity poor. The southeast's high quality (as indicated by high diversity) more than offsets the south central, and for the region as a whole, results in a slightly higher quality compared to

Region 9. More than half of Region 8 is surrounded by the ocean indicating scarcity is not much of a problem at all. While diversity is slightly better scarcity is less, and this Region 8 should have a value lower than Region 9 due to abundance of resources. A value of $50.00 per 12-hour RVD is suggested.

Region 5

Salt water fishing diversity off the coast of California is excellent. Although California does not have quite the diversity of the southeast, the quality due to diversity covers the entire region. Scarcity is not too much of a problem since almost half of California is bordered by ocean. These considerations would suggest a value between that of Regions 8 and 9. A value of $53.00 is suggested for a 12-hour RVD.

Region 6

Most people associate Washington and Oregon with salmon fishing; however, these two states also possess high quality salt water fishing comparable to that of the California coast. As with the coast, however, diversity increases as you move south. Scarcity is much less of a problem in Region 6 than Region 5. Comparable diversity but less scarcity indicates Region 6 should have a value below Region 5. A 12-hour RVD value of $50.00 is suggested.

SALT WATER FISHING	Region 1	Region 2	Region 3	Region 4	Region 5	Region 6	Region 8	Region 9	
Study Location								R.I.	R.I.
Author								McConnell	McConnell
Date of Data								TCM 1978	MM 1978
Reported Value/ Activity Day								30.34	67.06
Adjustment to 1982								40.81	90.19
Adjustment to Include Value of Travel Time									
Adjustment for Individual Observation									
Adjustment for Instate Only									
Adjusted Reported Values/ Activity Day								40.81	90.19
Regional Values per Activity Day									55.00
Regional Values/ 12-hour RVD (w/Studies)								55.00	
Regional Values/ 12-hour RVD (w/out Studies)	N/A	N/A	N/A	N/A	53.00	50.00	50.00		

HIKING

I. LITERATURE REVIEWED

Region 2

More studies of hiking values have been done in Colorado than in most other states. Walsh, Aukerman, and Milton (1980) found hiking-backpacking values associated with remote undeveloped high mountain reservoirs. Using on-site interviews and a noniterative open-ended Contingent Value Method, they found the value as $13.72 per activity day. Walsh and Olyienk (1981) used an on-site iterative Contingent Value Method to estimate the value of hiking and backpacking along the "Front Range" of Colorado. They found a value of $9.51 for a 4-hour hiking day and $9.36 for a 5.6-hour backpacking day. Rosenthal (1982) using on-site iterative Contingent Value Method, found an average value of $7.55 per RVD.

Region 3

Martin, Gum, and Smith (1974) estimated the value of general rural outdoor recreation in Arizona. Hiking was listed as the second most frequent activity. Martin, Gum, and Smith used the individual observation Travel Cost Method. The data came from a household survey of Arizona residents. They adjusted for travel time. The value reported was $66.54 per houshold trip. There were 3.4 persons per household trip and each trip lasted an average of 1.4 days. The value per activity day is $13.97 or $14 per day.

Region 6

Brown and Plummer (1979) have estimated the value of hiking-backpacking in western Washington (Dispersed Nonmotorized-ROS). They used a hedonic Travel Cost Method, but did not adjust for travel time. The value per recreation day is $9.40. Their data was based on on-site visitor registration.

Region 9

Kalter and Gosse (1970) estimated an average value of hiking in New York using the zonal Travel Cost Method. They did not adjust for travel time. Their data was from Bureau of Outdoor Recreation household survey. Their value was $16 per day (Tables 18 and 19 of their report).

II. METHODOLOGICAL ADJUSTMENTS

A. Updating to 1982 Base Year

Updating the Walsh et al. and Rosenthal studies to 1982 yields values of $15.62 and $8.14 per RVD. Updating the Walsh and Olyniek values to 1982 gives $10.67-$10.84 per day. In Region 3, updating Martin, Gum, and Smith's $14 in 1970 to 1982 yields a value of $30.80 per activity day. In Region 6, updating the Brown and Plummer values to 1982 yields an updated value of $14. Updating the Kalter and Gosse study yields an updated value of $35.20.

B. Adjustment for Omission of Travel Time

Both the Brown-Plummer study and Kalter-Gosse study omitted travel time. As discussed in the introduction, the agreed upon 30 percent upward adjustment is necessary to correct these values for such an omission. Doing this yields $18.20 for Brown and Plummer and $45.76 for Kalter and Gosse.

C. Adjustment for Individual Observation TCM

As discussed in the introduction, a slight downward adjustment is necessary to individual observation TCM to make it consistent with zonal TCM derived values. Making this adjustment to the Martin, Gum, and Smith value, yields $26 per day.

D. Adjustment for Instate Sample

While Martin, Gum, and Smith survey was restricted to Arizona residents, for National Forest hiking, this may not result in a substantial underestimation of dollar values. This is due to hiking being a more regionalized activity, at least given the National Forest resource attractiveness in Arizona. Thus, to be conservative, we will not adjust this value upwards.

III. VALUES FOR REGIONS WITH STUDIES

Region 2

The four values reported in Colorado are $8, $10, $10, and $15. The $8 is per RVD already. The other values would need to be doubled to put on an RVD basis. The $10 and $15 represent broader areas of the state, but the $15 is associated with hiking into water bodies and this value may not be representative of typical hiking conditions in Region 2. It seems that a value of $10 would be a reasonable value per activity day. However, $10 needs to be doubled or tripled since Walsh and Olyniek report time on site for these activities per day as between 4 to 6 hours. To be conservative we will recommend a value of $15 per RVD.

Region 3

The adjusted Martin, Gum, and Smith value of $26 per activity day represents a state average for Arizona and is a good representation for Arizona. However, population pressures in New Mexico are less than in Arizona, and the major population center is located at greater distance from National Forests in New Mexico compared to Arizona. Thus, a value for New Mexico would be lower. Overall, a value of $20 seems a good approximation of the value per activity day in Region 3 given this one study. However, this is quite above Region 2, a region with three times the number of studies. Thus a value of $16 is recommended as a conservative value per RVD, that is consistent with Region 2

Region 6

The Brown and Plummer adjusted value is $18 per day. This value seems reasonable for western Washington since there is a high quality resource (the Cascades) and high population levels. A value slightly lower would apply to western Oregon since there is less population pressure. Since a majority of the people and National Forest resources in Region 6 are concentrated in the western half of these states, a value of around $16 per day would seem fairly accurate for this region. Until acceptable length of stay information becomes available, this will be used as the value per RVD.

Region 9

Kalter and Gosse have an adjusted value of $45.76 per activity day for New York. Given the population pressures and scarcity of public land for hiking on this region, a value not too much lower than this seems reasonable. In states like Wisconsin, Minnesota, Michigan, Vermont, and New Hampshire, there is some National Forest land, much of it is high quality. To be consistent with other regions, a conservative value of $28 RVD seems appropriate.

IV. VALUES FOR REGIONS WITHOUT STUDIES

Region 1

The western portion of this region has some of the most outstanding areas for hiking in the country. Therefore, a value close to that of Region 2 would seem reasonable as a starting point. However, the small population levels and lack of equal quality resource in the eastern half of the state implies a lower value. Thus, a value of $13 for Region 1 seems reasonable and consistent with the empirical evidence in neighboring regions.

Region 4

The value of hiking in Region 4 can be built from Regions 1, 2, and 3. The southern half of Region 4 is very similar to Region 3. The northern half of Region 4 is similar to Region 1. Given the substantially lower population levels in Region 4, a value lower than Region 3 is appropriate. A value of $14 would seem a conservative value. Until acceptable length of stay figures become available, this will be the value recommended per RVD as well.

Region 5

The value in this region is quite different than most western regions, except Region 2. There is a high quality resource, but large population pressures that create a very high demand. Given this high demand, the value should be slightly greater than Region 2. A value of $17 would seem appropriate, given the value in Region 2. Until acceptable length of stay figures become available, this will be the value per RVD as well.

Region 8

The value in Region 8 can be built from the values in Region 3 and Region 9. Population densities in Region 8 are closer to Region 9. The distribution of and amount of National Forest acreage is about the same. However, quality for hiking is higher in many northeast areas. A value of $20 would seem consistent with values found in Region 9. This will also be the value per RVD.

HIKING	Region 1	Region 2		Region 3	Region 4	Region 5	Region 6	Region 8	Region 9
Study Location Author Date of Data		Colorado Walsh et al. 1978	Colorado Walsh & Olyienk (1980)	Colorado Rosenthal (1981)	Arizona Martin Gum & Smith (1970)			Washington Brown Plummer (1976)		New York Kalter & Gosse (1970)
Reported Value/ Activity Day		13.72	9.36-9.51 (4-6 hrs)	7.55	14.00			9.40		16.00
Adjustment to 1982		15.62	10.67-10.84	8.25	30.80			14.00		35.20
Adjustment for Value of Travel Time								18.20		45.76
Adjustment for Individual Observation					26.00					
Adjustment for Instate Only										
Adjustment for Reported Values per Activity Day		15.62	10.67-10.84	8.14	26.00			18.20		45.76
Regional Values per Activity Day			10.00					16.00		28.00
Regional Values per 12-hour RVD w/Studies			15.00		16.00			16.00		28.00
Regional Values per 12-hour RVD w/out Studies	13.00					14.00	17.00		20.00	

MOTORIZED BOATING

I. LITERATURE REVIEWED

Region 3

Ward (1982) estimated that an average value of $11.39 per day for motorized boating at reservoirs in southeastern New Mexico. Ward used an individual observation Travel Cost Method. He adjusted for substitutes and travel time. The household survey was restricted to only neighboring counties.

Region 6

Sutherland (1980) estimated the average value of motorized boating in Oregon and Washington using a zonal Travel Cost Method. He did not adjust for travel time, however. His average value was $4.24 per day.

Region 9

Kalter and Gosse (1969) used a zonal Travel Cost Method to estimate the average value of motorized boating in the State of New York. Their study did not adjust for travel time. They found an average value of $15.14.

II. METHODOLOGICAL ADJUSTMENTS

A. Adjustment to 1982 Base Year

Updating the Ward, Sutherland, and Kalter-Gosse study to 1982 yields values of $15.32, $4.83, and $33.40 per activity day.

B. Adjustment for Omission of Travel Time

The Sutherland study omitted travel time and, therefore, making the agreed upon 30 percent upward correction yields a value of $6.28. The Kalter and Gosse study also failed to adjust for travel time and making this same 30 percent correction yields a value of $43.42 per activity day.

C. Adjusting for Individual Observation TCM

As discussed in the introduction, a downward adjustment is necessary to make values derived from individual observation TCM consistent with zonal TCM. Since the probability of participation in motorized boating is likely to be equally affected by travel cost as by ownership of equipment, a slight downward adjustment is necessary. Doing this to Ward's study yields a value of $13 per activity day.

D. Adjustment Due to Instate Sample

Ward's sample was restricted to just counties adjacent to the reservoirs. Both more distant counties and acknowledged out-of-state residents (Texas) were omitted from sampling. While motorized boating at reservoirs is somewhat of a regional activity, these more distant observations are still important. Therefore, an adjustment to $14 per activity day is appropriate.

III. VALUES FOR REGIONS WITH STUDIES

Region 3

The $14 value per day in southeastern New Mexico is probably below the average value of New Mexico and Arizona. This is due to the fact that the reservoirs in this study are remote from population centers, whereas most of the National Forest flat water recreation resources used for motorized boating in Arizona are relatively close to Arizona's main population centers. Thus, the net value per day would be much higher in Arizona due to higher population and proximity than in Mexico. Thus, a value of $16 is recommended as the value per RVD in Region 3.

Region 6

Sutherland's adjusted regional value of $6.28 appears to be a reasonable approximation of the average value of motorized boating on National Forest lands. This value is low, but the large supply of both National Forest areas and non-National Forest areas (Pugent Sound, the ocean) would substantiate such a large difference between values. Therefore, a value of $6 per RVD is recommended as the value for Region 6.

Region 9

The $43 adjusted value from Kalter and Gosse provides a starting point for estimating this value. This value is probably too high, however, as a regional average. New York has some of the higher quality flat water resources as well as high population levels. This value is probably descriptive of New England but not of Missouri and Iowa due to lower population levels there. In addition, the large supply of flat water recreation resource in Minnesota, Michigan, and Wisconsin argues for a lower value, even though the quality is quite high. And yet, the lack of publicly accessible flat water areas relative to large population factors argues for a value around $30 per activity day. To be conservative and consistent with other regions, a value of $20 per RVD is recommended as the value for Region 9.

IV. VALUES FOR REGIONS WITHOUT STUDIES

Region 1

Motorized boating in Region 1 is in many ways similar to Region 6. However, the supply of non-Forest Service flat water recreation is much less in this region. This argues for a higher value per day, while lower population levels argue for a smaller dollar value. Thus a value of $9 per RVD seems appropriate for Region 1.

Region 2

The value in Region 2 can be built from the value in Region 1 and Region 3. The higher population levels and greater scarcity of flat water recreation opportunities in Region 2 as compared to Region 1, implies a higher value per day. However, the value in Region 2 should be lower than the value in Region 3 due to greater scarcity and hotter temperatures in Region 3 than in Region 2. Thus, a value of $12 per RVD would seem appropriate for Region 2.

Region 4

The value in Region 4 can be built from the value in Regions 1, 2, and 3. The southern half of Region 4 is similar to Region 3. The northern half of Region 4 is similar to Regions 1 and 2. Thus, a value of $11 would seem appropriate for Region 4 for motorized boating.

Region 5

The values in Region 5 would be similar to Region 3 and Region 6. The availability of the ocean would imply a value closer to Region 6, but the high population levels and moderate temperatures imply a value closer to Region 3. Thus, a value of $10 per RVD would seem reasonable given the available data and values in other regions.

Region 8

The value in Region 8 is much like that of Regions 3, 5, and 6. Certainly Texas, Oklahoma, and Arkansas would have values similar to Region 3. The coastal states would have a value closer to Region 5. However, there are many more substitute flat water areas in this region than either Region 3 or 5. Thus, a value closer to Region 6 would seem appropriate. Adjusting for the land ownership differences between Region 8 and 6, we recommend a value of $10 per RVD in this region.

MOTORIZED BOATING	Region 1	Region 2	Region 3	Region 4	Region 5	Region 6	Region 8	Region 9
Study Location			New Mexico			Ore-Wash		New York
Author			Ward			Sutherland		Kalter & Gosse
Date of Data			(1978)			(1980)		(1965)
Reported Value/ Activity Day			11.39 Avg.			4.24 Avg.		15.14
Adjustment to 1982			15.32			4.83		33.40
Adjustment for Individual Observation			13.00					
Adjustment for Instate Only			14.00					
Adjustment of Reported Values per Activity Day			14.00			6.28		43.42
Regional Values per Activity Day			16.00			6.00		20.00
Regional Values per 12-hour RVD (w/studies)			16.00			6.00		20.00
Regional Values per 12-hour RVD (w/out studies)	9.00	12.00		11.00	10.00		10.00	

MOTORIZED TRAVEL

I. REVIEW OF LITERATURE

Region 2

The only study we found for motorized recreation was on ORV study done on Forest Service land in Colorado. They found a value of $6.45 for a visit lasting 4.2 hours.

This study utilized the contingent value method (CVM). It was an on-site interview using iterative bidding. The payment vehicle was change in trip costs. The study was done by Walsh and Olyrenk (1981) of Colorado State University. The reviewer felt this study was well done and there was no evidence that led us to believe the value was too high or too low.

II. METHODOLOGICAL ADJUSTMENTS

A. Conversion to 1982 base year converting the $6.42 to 1982 yields $6.70. No other metholodological adjustments are necessary.

III. VALUES FOR REGIONS WITH STUDIES

Region 2

This value reflects the value of motorized land recreation along the "Front Range" in Colorado. Since this represents the National Forests closest to population centers, the net value is likely to be higher than for other forest in Colorado, Wyoming, and South Dakota. Thus a value of $6 per activity day seem reasonable for Region 2. The time on site was reported in this study as 4.2 hours. To be conservative, we will adjust to an RVD basis as we have done for other activities and recommend a value of $12 per RVD.

IV. VALUES FOR REGIONS WITHOUT STUDIES

Region 1

With less population and a resource of equal quality, we would expect the value per RVD in Region 1 to be slightly less than that of Region 2. Until further research is done, a value of $11 per RVD seems a reasonable recommendation.

Region 3

The large amount of non Forest Service public land and similar population levels to Region 2, seems to imply a value slightly less than in Region 2. Thus a value of $11 per RVD is recommended for Region 3.

Region 4

Region 4 has a large supply of non Forest Service public land open to motorized travel (both on and off road) and relatively low population levels. The quality in much of Region 4 is similar to quality in Region 3. Thus value below Region 3 is appropriate. We recommend a value of $10 per RVD for region 4.

Region 5

The high population and income levels imply a higher demand than in any other western region. The availability of public lands for motorized travel is also large, but not in comparison to population levels. Generally, physical quality of resource is good, but user congestion reduces value somewhat. Thus a value greater than Regions 2 and 3 seem appropriate. A value of $13 per RVD is recommended for Region 5.

Region 6

The large amount of Forest Service land provides an ample supply relative to the population in this region. Hundreds of paved and logging roads provide a vast road network in each of these states. The quality

MOTORIZED TRAVEL	Region 1	Region 2	Region 3	Region 4	Region 5	Region 6	Region 8	Region 9
Study Location		Colorado						
Author		Walsh						
Date of Data		Olyienk (1980)						
Reported Value/ Activity Day		6.45 (4.2 hrs)						
Adjustment to 1982		6.70						
Adjustment for Value of Travel Time								
Adjustment for Individual Observation								
Adjustment for Instate Only								
Adjustment Report Values per Activity Day		6.70						
Regional Values per Activity Day		6.00						
Regional Values per 12-hour RVD w/Studies		12.00						
Regional Values 12-hour RVD w/out Studies	11.00		11.00	10.00	13.00	12.00	11.00	14.00

NONMOTORIZED BOATING

I. LITERATURE REVIEWED

Region 2

Walsh, Ericson, Arosteguy, and Hansen (1980) used a noniterative open-ended Contingent Value Method to estimate the average value of rafting and kayaking on nine rivers in western Colorado. The value per day was $12.65 for kayaking and $10.94 for rafting. The 206 interviews took place on site.

Region 3

Keith (1981) found a value of $23.79 per day using the individual observation Travel Cost Method for recreational floating in Arizona. The "put-in" point on this river is on Forest Service land. The data necessary to do the analysis was collected from on-site interviews.

Regions 1 and 4

Michaleson (1977) estimated the value of floating the Middle Fork of the Salmon River and several nonwild and scenic rivers in Idaho. The value per day for the Middle Fork of the Salmon River was $76.85 per activity day. The average value for the other rivers was $10.36. Michaleson used the individual observation Travel Cost Method. His study adjusted for travel time.

Bowes and Loomis (1980) estimated the values of white water rafting, kayaking, and floatboating on the Colorado River in Utah. They used a zonal Travel Cost Method but did not adjust for travel time. Their value was $19 per activity day. The data came from trip permits.

Region 6

Sutherland (1980) estimated the value of boating in Oregon and Washington using the zonal Travel Cost Method. He did not adjust for travel time, however. Sutherland found an average value of $4.24 per day.

II. METHODOLOGICAL ADJUSTMENT

A. Updating Values to 1982

The Walsh et al. data was from 1978, so updating to 1982 makes this $16.95 for kayaking and $14.65 for rafting per day. Michaleson's data on the Middle Fork of the Salmon was 1969 and on the other rivers was 1971. Updating these values to 1982 yields $176.62 and $21.85, respectively. Updating Keith's study yields a value of $24.79 for Arizona. Updating the Bowes and Loomis data from 1978 yields a value of $25.55 per day. Lastly, updating Sutherland's values to 1982 yields $4.83.

B. Adjustment for Ommission of Travel Time

The Sutherland value for Oregon-Washington derived from zonal TCM did not adjust for travel time. Making the agreed upon 30 percent upward adjustment to correct for this yields a value of $6.28 per day. The Bowes and Loomis study also did not adjust for travel time and correcting for this makes their value $33.22 per day.

C. Adjustment for Individual Observation TCM

The probability of participating in nonmotorized boating may be influenced as much by travel costs as by ownership of specialized equipment and possession of requisite boating skills. This is a small downward adjustment of Michaleson's and Keith's individual observation TCM values is necessary to make them comparable to zonal TCM values. Making this adjustment to Michaleson's values yields new values of $150 to $18.50. Making this adjustment to Keith's values gives $21 per day.

III. VALUES FOR REGIONS WITH STUDIES

Region 1

Using Michaleson's Idaho values as a starting point, we would expect a value between $150 and $18.50 a day. The $150 reflects the value of a unique resource, the Middle Fork of the Salmon. Since this is in Region 4's portion of Idaho, the value per day associated with other rivers in Idaho $18.50. Since we do not have other estimates specific to Montana's portion of Region 1, and due to the basic similarities of the resources in terms of setting, seasons of use, lack of population pressure, etc., the value of $18 seems appropriate. Since this value is related to nonmotorized river recreation which is scarcer than nonmotorized boating on lakes, a value of $17 per RVD may see to represent a reasonable value for nonmotorized boating in general.

Region 2

The work of Walsh provides a range of $14 - $16.95 per day for rafting on rivers in western Colorado. Rivers that are closer to population centers would have higher net values. Thus as an average value for Colorado of $17 per day seems appropriate. Other nonmotorized boating on lakes and reservoirs in National Forest settings would be similar in value, but slightly below the river values due to scarcity of free flowing rivers as compared to lakes. Therefore, an average Colorado value of $16 for nonmotorized boating. The value in Wyoming would be similar to Colorado. However, the values in Kansas, Nebraska, and South Dakota would be different. South Dakota and Nebraska are closer to Wyoming in types of nonmotorized boating. Scenery quality in all three of these states is below that in Colorado and Wyoming. Thus, taking all three factors into account, an average value of $16 per RVD in Region 2 is recommended.

Region 3

Keith's value of $21 per day in Arizona is our starting point for this region. This value may be slightly above average since this nonmotorized boating resource is close to population centers and is river type recreation. However, a value above most of the other regions would seem appropriate due to the hot-arid nature of most of Region 3. Generalizing the Arizona value to New Mexico would require lowering of the value as well. Thus a value of $19 per RVD is recommended for nonmotorized boating in Region 3.

Region 4

Using Michaleson and Bowes-Loomis studies, we get activity values of $18.50 - $33.22 and $150. The high value is the Middle Fork of the Salmon. Since there are several rivers of comparable quality in Region 4's portion of Idaho, a value per RVD of $100 or more is likely on several rivers.

The values between $18.50 and $33.22 apply to less well known or less outstanding river recreation resources. An average value for nonmotorized boating is going to have a very wide variation. Perhaps a value of $30 would be appropriate for river type nonmotorized boating. Generalyzing this to general nonmotorized boating on lakes and reservoirs in a National Forest setting requires lowering the value somewhat to take into account scarcity of free flowing rivers relative to flat water recreation resources. While few in number, many of these areas of flat water recreation are large in size. Thus, until more site-specific values are empirically estimated, a value of $24 per RVD is recommended. Note that for some nonmotorized boating activities provided in Region 4, thus the recommendation is far below the probable value.

Region 6

The Sutherland study provides the starting point for suggesting values for Oregon and Washington. The $6.28 represents an average value for predominantly flat water nonmotorized type boating. The relatively higher value white water and other river recreation values seem to not be explicitly addressed. Thus, in contrast to Regions 1, 2, 3, and 4, to generalize this value, we must raise it somewhat. Given the large number of lakes and rivers available for nonmotorized boating in Oregon and Washington (Pugent Sound in Washington, for example) the value of additional National Forest nonmotorized boating is less than for other regions. Taking the high quality of the resource into account, a regional value of $10 per RVD is consistent with the available evidence. This value will be a substantial understatement for white water recreation on Oregon's wild and scenic rivers, however.

IV. VALUES FOR REGIONS WITHOUT STUDIES

Region 5

California is similar to Region 3 in the value of additional river recreation on National Forests. California's population pressure creates a large demand. While there are many flat water nonmotorized boating recreation resources in the state, there are very few river recreation resources near the large population centers. Given the scarcity, hotter climates, and greater population, a value higher than Region 6 seems appropriate. A value of $14 per RVD is recommended for California until subsequent research is performed.

Region 8

The large supply of rivers and water bodies for flat water recreation makes the value of additional nonmotorized boating quite low. A value even below that of Region 6 would seem appropriate because while the supply relative to population is similar, the resource quality is not as great as Region 6. The warm climate argues for a value close to Region 3, however. A value of $8 per RVD is recommended for Region 8 until subsequent research is performed.

Region 9

Region 9 has high population and income levels making demand quite high. However, there is a great deal of flat water recreation resource for nonmotorized boating. While the quality varies, there are several outstanding nonmotorized boating resources in this region (e.g., Boundary Waters Canoe Area to name one). Nonmotorized river recreation is quite scarce relative to demand, so again a higher value for Region 9 compared to Regions 6 and 8 is called for. Given the values in the other regions, a value of $15 per RVD is recommended for Region 9.

NONMOTORIZED BOATING	Region 1	Region 2	Region 3		Region 4	Region 5	Region 6	Region 8	Region 9
Study Location	Idaho	Colorado	Arizona	Idaho	Utah		Ore-Wash		
Author	Michaleson	Walsh, et al.	Keith	Michaleson	Bowes-Loomis		Sutherland		
Date of Data	(1969, 1971)	1978	(1981)	(1969, 1971)	(1978)		1980		
Reported Value/ Activity Day	76.85 10.36	10.94-12.65	23.79	76.85-10.36	19.00		4.24		
Adjustment to 1982	176-21.85	14.65-16.95	24.79	176-21.85	25.55		4.83		
Adjustment for Value of Travel Time					33.22		6.28		
Adjustment for Individual Observation	150-18.50		21.00	150-18.50					
Adjustment for Instate Only									
Adjustment Reported Values per Activity Day	150-18.50	14.65-16.95	21.00	150-18.50	33.22		6.28		
Regional Values per Activity Day	18.00	16.00	19.00		24.00		10.00		
Regional Values per 12-hour RVD w/Studies	18.00	16.00	19.00		24.00		10.00		
Regional Values per 12-hour RVD w/out Studies						14.00		8.00	15.00

PICNICKING

I. LITERATURE REVIEWED

Region 2

The most explicit study of picnicking was done by Walsh and Olyniek (1981) using on-site iterative Contingent Value Method. Walsh and Olyniek found a value of $6.22 per 4.2 hour day. This study was done at several sites along the Front Range in Colorado.

Another Colorado study was of picnicking related recreational use of developed and semi-developed high mountain reservoirs (Walsh, Aukerman, and Milton 1980). Using on-site noniterative open-ended Contingent Value Method, they found an average value for these two types of reservoirs of $10.90 per day.

Region 3

Martin, Gum, and Smith (1974) estimated the value of general rural outdoor recreation in Arizona using the individual observation Travel Cost Method. One of the dominant activities was picnicking. This was a household survey limited to residents only. Martin, Gum, and Smith found a value of $66.54 per household trip. Since there were 3.4 people per household trip, a value per person per trip is $19.57. Since most trips taken primarily for picnicking are 1 day or less in duration, this becomes the value per day. Their study adjusted for travel time and tested for substitutes. Ward (1982) estimated the value of recreation at several reservoirs in southeastern New Mexico. Since these reservoirs include state parks, some in close proximity to population centers, picnicking is likely to be one of the most frequent activities. Ward used an individual observation Travel Cost Method to estimate a value of $11.39 a day. While

the sample was restricted only to counties adjacent to each reservoir under study, this limitation is not of too great a concern for a localized activity such as picnicking. This model adjusted for travel time and substitutes.

Region 5

Knetsch, Brown, and Hansen (1976) estimated the value of day trips to California reservoirs using a regional zonal Travel Cost Method. Their model reflected travel time and substitute sites. Again, picnicking reflects a large proportion of the use at these reservoirs. These authors estimated an average value of $3.33 in 1969 dollars.

II. METHODOLOGICAL ADJUSTMENTS

A. Updating to 1982 Base Year

Updating the two Colorado studies the values go from $6.22 and $10.90 to $6.53 and $12.41. The two studies in Region 3, go from $19.37 and $11.39 to $42.61 and $15.32, respectively. Updating the California study from 1969 to present yields a value of $7.75 per day.

B. Adjustment for Omission of Travel Time

None of the TCM studies omitted travel time.

C. Adjustment for Individual Observations

As discussed in the introduction, a downward adjustment is necessary for studies that used individual rather than zonal TCM when probability of participation is strongly related to travel costs. Picnicking is felt to be one of those activities. Thus, the Martin, Gum, and Smith values and Ward's values (both Region 3) must be adjusted downward by 30 percent. Making this adjustment to Martin, Gum, and Smith's $42.61 and Ward's $15.32 yields values of $28.54 and $10.26, respectively.

D. Adjustment Due to Instate Sample

While the Martin, Gum, and Smith study was restricted to instate samples, this is not a serious bias for a localized activity such as picnicking. The restriction of Ward's sample to counties adjacent to the reservoir is more of concern, but to be conservative, no adjustment will be made here, but this factor was taken into consideration in reconciling the two different study values.

III. VALUES FOR REGIONS WITH STUDIES

Region 2

The two Colorado studies have a value of $6.53 to $12.41 per day. The value of $6.53 is from several different areas in Colorado, so is generally more representative than $12.41 which pertains to picnicking by lakes. A value of $9 per activity day seems appropriate and perhaps conservative. This value would seem to be generalizable to Wyoming and South Dakota. It may be too high for Kansas and Nebraska, however. So a value of $7 per activity day would seem appropriate for Region 2 as a whole.

Walsh and Olyienk (1981) reported the length on site for picnicking trips as 4.2 hours. Therefore, to convert the $7 per activity day to a 12-hour RVD, we multiply $7 times 2.85 activity days per RVD. This yields a value of $19.95 per RVD for Region 2. However, to be conservative, we will follow the panels more general guidance and just double the value. Therefore, a value of $14 per RVD is recommended.

Region 3

The two studies from this region have values of $10.26 and $28.54 per activity day. As mentioned earlier, Ward's $10.26 reflects a sample of only local county residents, and thus, is probably a little low. Also,

Ward's value is for the sparsely populated and remote sites of New Mexico rather than areas near major population centers (Albuquerque, Santa Fe). Martin, Gum, and Smith's is a state-wide average for Arizona. Taking these factors into account, a value per activity day for Region 3 of $14 seems consistent with the two studies. Since no data is available on length of stay for picnicking, this value will be used per RVD as well.

Region 5

The Knetsch, Brown, and Hansen study gives a value of $7.75 per activity day. This value seems reasonable for the sites studied, but may be a little low for Forest Service areas since they are of higher scenic quality than many of the study sites. Thus, a value of $8 per activity day is suggested. This will also be the value per RVD since no data on length of stay is available.

IV. VALUES FOR REGIONS WITHOUT STUDIES

Region 1

Probably the closest region with a study is Region 2. The range of values in Region 2 was $6.53-$12.41. Region 1, however, has less population. Therefore, the value should be at the lower end of this range. While quality is high it is probably similar to Region 2. Thus, a value of $7 is recommended for Region 1 per activity day. This will also be the value per RVD until acceptable length of stay data becomes available.

Region 4

Region 4 values can be derived from Region 2 and 3. Given the low population levels, the large supply of public land, the value would tend to be below that of neighboring regions. A value between $8 and $10

would seem reasonable. Given the tremendous diversity of National Forest settings in this region, $8 will probably be too low for the "Wasatch Front" and southern Idaho, but too high for areas in the non-Lake Tahoe area of Nevada. However, as an average, $8 per activity day seems reasonable. Until acceptable length of stay data becomes available, this will be the data per RVD.

Region 6

The value in Region 6 is probably similar to Region 2 also. Quality is similar, if not slightly better, in Region 6 and population levels are higher. Therefore, a value closer to the upper end of the $6.53-$12.41 range is appropriate. Perhaps, $10 per activity day is reasonable. This will be recommended as the value per RVD until new information is made available on length of stay.

Region 8

This region is quite different than most western regions. There are very few public land areas and population levels are quite high. Scenic quality is generally good, but often not as spectacular as many western areas. Until site-specific studies are done, the scarcity-population factors dictate a high value. Perhaps a value per activity day of $10 would be reasonable. This will be recommended as the value per RVD as well.

Region 9

The value in Region 9 would be higher than that of Region 8 due to higher quality and greater population pressures. A value of $12 does not seem inconsistent with the values in other regions. This value will be recommended as the value per RVD for Region 9.

PICNICKING	Region 1	Region 2		Region 3		Region 4	Region 5	Region 6	Region 8	Region 9
Study Location		Colorado	Colorado	Arizona	N. Mexico		Knetsch			
Author		Walsh &	Walsh	Martin	Ward		Brown &			
Date of Data		Olyniek (1981)	et al. (1980)	Gum Smith (1970)	(1978)		Hansen (1969)			
Reported Value/ Activity Day		6.22 (4.2 hrs)	10.90	19.57	11.39		3.33			
Adjustment to 1982		6.53	12.41	42.61	15.32		7.75			
Adjustment for Value of Travel Time										
Adjustment for Individual Observation				28.54	10.26					
Adjustment for Instate Only										
Adjustment Reported Values per Activity Day		6.53-12.41		28.54-10.26			7.75			
Regional Values per Activity Day		7.00		14.00			8.00			
Regional Values per 12-hour RVD w/Studies		14.00		14.00			8.00			
Regional Values per 12-hour RVD w/out Studies	7.00					8.00		10.00	10.00	12.00

SMALL GAME HUNTING

I. LITERATURE REVIEWED

Region 3

Martin, Gum, and Smith (1974) utilized the individual observation Travel Cost Method to derive the value of small game hunting in Arizona. Data was collected in 1970 and sampling was restricted to instate users only. Adjustment for substitutes and travel time were made in the study. The study reports a statwide average value of $23.89 per household trip. The average days per household per trip is 1.1 resulting in a value of $21.72 per household. The average number of persons per household trip is 1.5 resulting in a value of $14.48 per visitor day.

Region 4

The first study in this region was done in Idaho by Brown and Plummer (1979). They utilized the zonal Travel Cost Method in combination with the Hedonic Method to allow for better utilization of available data. Data was obtained from the 1976 Recreation Information Management System (RIM) and the 1976 RARE II analysis. The study did not adjust for travel time or substitutes. The study reports a value of $21.43 per visitor day.

A regionwide value was obtained by Hansen (1977) utilizing data from the 1975 U.S. Fish and Wildlife Service Hunting and Fishing Survey. The Hunting and Fishing Survey used a noniterative open-ended contingent value mail questionnaire. The study reports a regional value of $13.95 per visitor day.

Region 8

Bell (1981) utilized the Hedonic Method to derive small game hunting values for the south central portion of Louisiana. Data from the 1975 National Survey of Hunting and Fishing along with the Atchafalaya Basin Users Survey was analyzed. The study adjusted for substitutes and travel time. A value of $9.79 per visitor day is reported.

II. METHODOLOGICAL ADJUSTMENTS

A. Conversion of study data date to a 1982 base year.

Region 3

Converting the study date of Martin, Gum, and Smith's Arizona study results in a value of $31.95.

Region 4

This region's values convert to $32.75 and $22.42 for Brown and Plummer (1979) and Hansen (1975), respectively.

Region 8

The 1975 south central Louisiana value of $9.79 converts to a 1982 value of $15.74.

B. Adjustment for omission of travel time.

The Idaho study done by Brown and Plummer (1979) is the only TCM study which did not adjust for travel time. Adjusting the value of $32.75 up by 30 percent results in a value of $42.58.

C. Adjustment for individual observations.

Martin, Gum, and Smith's study in Arizona is the only study which utilized individual observation TCM. Since the probability of participation in small game hunting is inversely related to travel cost, a downward adjustment is necessary. Downward adjustment of the value results in a value of $23.93.

D. Adjustment due to instate sample.

Martin, Gum, and Smith's study is restricted to an instate sample. However, no upward adjustment is necessary since small game hunting is a local or regional type activity and would not often draw from a multistate area.

III. VALUES FOR REGIONS WITH STUDIES

Region 3

The adjusted value for Martin, Gum, and Smith's study is $23.96. This value is for the State of Arizona which has a slightly higher quality of small game hunting relative to New Mexico. Both states have similar scarcity properties, therefore, a slight downward adjustment of this value will take into account the lower quality of the resource in New Mexico. A value of $22.00 per activity day is suggested.

The value as reported by Martin, Gum, and Smith represents a 12-hour RVD.

Region 4

Adjusted values ranged from $22.42 to $42.58. The value of $42.58 is for Idaho only which has a higher quality of small game hunting relative to the rest of the region. Recent jackrabbit population explosions confirm this. The value of $22.42 is a regionwide average and, therefore, a more appropriate value. A value of $23.00 per activity day is suggested.

This value represents a 12-hour RVD.

Region 8

The adjusted value for Bell's study is $15.74. This value is for south central Louisiana which is mostly a marsh area of relatively high quality of small game hunting. The northern portion of the region has a lower quality relative to the study area. Scarcity in the rest of the region is only slightly more pronounced than the study area as indicated by the declining populations of small game over the entire region. For these major reasons, Bell's value should be adjusted downward somewhat. A value of $14.00 per activity day is appropriate. In the study, Bell reports an activity day as lasting 3.97 hours. This is approximately half a 12-hour RVD and, therefore, the value reported should be doubled to be consistent with other studies which report values for a full 12-hour RVD.

IV. VALUES FOR REGIONS WITHOUT STUDIES

Region 9

The quality of small game hunting in Region 9 is much greater than that of Region 8. This is especially true in the north central portion of the region. Scarcity is much less of a problem in Region 9, and the scarcity aspect is the more dominant factor indicating Region 9's value should be slightly lower than Region 8's value. A value of $25.00 is appropriate. This value represents a 12-hour RVD.

Region 2

Supply of small game relative to the hunting population has dropped dramatically over the last 30 years in this region; indicating scarcity is of major concern. The quality of small game hunting in Region 2 is similar to Region 9, but scarcity is a more dominant factor. A value of $26.00 per 12-hour RVD is suggested to reflect the scarcity problem of a high quality resource.

Region 1

Small game hunting in this region is of high quality and the supply of small game relative to the hunting population has increased in the last couple of years. The quality in this region is similar to that of Region 4 but the supply is more abundant than Region 4. A value of $21.00 per 12-hour RVD reflects similar quality, but a lesser scarcity problem in comparison to Region 4.

Region 5

The supply of small game relative to the hunting population has remained fairly constant over the last 20 years; however, this constant supply is very low. As a result, scarcity is a problem but not a growing problem. The quality in California is not as great as that of Region 4. These considerations indicate a slightly lower value for Region 5 relative to Region 4. A value of $22.00 per 12-hour RVD is suggested.

Region 6

The quality of small game hunting in Region 6 is not as high as that of Region 4. Supply of small game relative to the hunting population is comparable between the two regions. A value of $21.00 per 12-hour RVD reflects comparable scarcities but lower quality.

SMALL GAME HUNTING	Region 1	Region 2	Region 3		Region 4	Region 5	Region 6	Region 8	Region 9
Study Location			Ariz.		Idaho				
Author			Martin Gum	Region	Brown			Louis.	
Date of Data			Smith 1970	Hansen 1975	Plummer 1976			Bell 1975	
Reported Value/ Activity Day			14.48	13.95	21.43			9.79	
Adjustment to 1982			31.95	22.42	32.75			15.74	
Adjustment to Include Value of Travel Time					42.58				
Adjustment for Individual Observation			23.93						
Adjustment for Instate Only									
Adjusted Reported Values/ Activity Day	None	None	23.93	22.42	42.58	None	None	15.74	None
Regional Values per Activity Day			22.00		23.00			14.00	
Regional Values/12-hour RVD (with Studies			22.00		23.00			28.00	
Regional Values/12-hour RVD (without Studies)	21.00	26.00				22.00	21.00		25.00

UPLAND GAME BIRD HUNTING

I. LITERATURE REVIEWED

Region 4

Only one study dealt with valuation of upland game bird hunting. Hansen (1977) utilized data from the 1975 U.S. Fish and Wildlife Service Hunting and Fishing Survey to derive a regionwide average value for all states in Region 4. The Hunting and Fishing Survey used a noniterative open-ended contingent value mail questionnaire. Other than a lower than desirable return rate (30%), the study is acceptable. Only the new willingness to pay values from Hansen's study are reported here. An average dollar value of $23.06 per activity day was derived.

II. METHODOLOGICAL ADJUSTMENTS

A. Conversion of study data date to 1982 base year.

Hansen's 1975 value of $23.06 converts to a 1982 value of $37.06.

No other adjustments are necessary.

III. VALUES FOR REGIONS WITH STUDIES

Region 4

The study by Hansen (1977) reports a regionwide value. Since the study is sound, Hansen's value of $37.00 is appropriate for Region 4. This value represents a 12-hour RVD as reported in the study.

IV. VALUES FOR REGIONS WITHOUT STUDIES

Regions 1 and 2

Both these regions have similar amounts of public lands and both contain higher quality upland game bird habitat relative to Region 4. These two regions also have slightly lower human population levels and, therefore, less of a resource scarcity problem. Quality of the resource is the more dominant factor between these regions, suggesting a value of $39.00 per 12-hour RVD to be appropriate for Regions 1 and 2.

Region 3

The quality of upland game bird hunting in Region 3 is much better than the quality in Region 4. Supply relative to population is slightly less in Region 3 resulting in a slightly more scarce resource. The high quality and high scarcity indicate Region 3 should have a higher value than Region 9. A value of $38.00 is appropriate for a 12-hour RVD in Region 3.

Region 5

This region has the land which could support upland game bird hunting. Unfortunately, human population levels are so high that habitat has been ruined, and as a result the resource of upland game birds is scarce and of low quality. The scarcity factor balances with the low quality factor indicating Region 4's value of $37.00 per 12-hour RVD is also appropriate for Region 5.

IV. VALUES FOR REGIONS WITHOUT STUDIES

Regions 1 and 2

Both these regions have similar amounts of public lands and both contain higher quality upland game bird habitat relative to Region 4. These two regions also have generally low human population levels and, therefore, less of a resource scarcity problem. Quality of the resource is the more dominant factor between these regions, suggesting a value of $39.00 per 12-hour RVD to be appropriate for Regions 1 and 2.

Region 3

The quality of upland game bird hunting in Region 3 is much better than the quality in Region 4. Supply relative to population is slightly less in Region 3 resulting in a slightly more scarce resource. The high quality and high scarcity indicate Region 3 should have a higher value than Region 9. A value of $38.00 is appropriate for a 12-hour RVD in Region 3.

Region 5

This region has the land which could support upland game bird hunting. Unfortunately, human population levels are so high that much of the habitat has been lost, and as a result the resource of upland game birds is scarce and of low quality. The scarcity factor balances with the low quality factor indicating Region 4's value of $37.00 per 12-hour RVD is also appropriate for Region 5.

Region 6

Region 6 has abundant land to support a high quality of upland game bird hunting. This factor would suggest a value greater than Regions 1 and 2. In addition, human population levels are greater in Region 6 than in Regions 1 and 2, but not as high as in Region 5. Therefore, a value above Regions 1 and 2 is appropriate. A value of $40.00 is suggested. This value would represent a 12-hour activity day.

Region 8

The quality of upland game bird hunting has dropped continuously over the last 30 years in the Southeast. At the same time, human population levels have been increasing in the Southeast. A resource of high quality is now very scarce indicating upland game bird hunting in this region has a high value. A value of $40.00 per 12-hour RVD is suggested.

Region 9

Populations of upland game birds have actually increased in Region 9, indicating a decrease in scarcity. At the same time, quality of the resource has stayed about the same. A value lower than Region 8 is appropriate; however, not too much lower since quality is much greater in Region 9. A value of $39.00 per 12-hour RVD is suggested.

UPLAND GAME BIRD HUNTING	Region 1	Region 2	Region 3	Region 4	Region 5	Region 6	Region 8	Region 9
Study Location				Region				
Author				Hansen				
Date of Data				1975				
Reported Value/ Activity Day				23.06				
Adjustment to 1982				37.06				
Adjustment to Include Value of Travel Time								
Adjustment for Individual Observation								
Adjustment for Instate Only								
Adjusted Reported Values/ Activity Day	None	None	None	37.06	None	None	None	None
Regional Values per Activity Day				37.00				
Regional Values/12-hour RVD (with Studies)				37.00				
Regional Values/12-hour RVD (without Studies)	39.00	39.00	38.00		37.00	40.00	40.00	39.00

WATERFOWL HUNTING

I. LITERATURE REVIEWED

Hammack and Brown (1972) used the Contingent Valuation Method to derive a value for waterfowl hunting in the Pacific Flyway. This Flyway includes states in Regions 3, 4, 5, and 6. When deriving values for regions, this study will be considered for the four regions, but will not be reviewed separately under each region. The review given now applies to each of the four regions (i.e., the entire Pacific Flyway).

Hammack and Brown's CVM study was a mail, noniterative open-ended questionnaire. Respondents were asked willingness to pay additional costs during the waterfowl season. Data was collected in 1968. A value of $256 per hunter is reported. A hunter spends an average of 10.5 days afield during the season resultingin a value of $25.00 per activity day.

Region 3

Using individual observation TCM, Martin, Gum, and Smith (1974) derive a value for waterfowl hunting in Arizona. Data was collected in 1970. Substitutes and travel time were adjusted for in the study. A value of $9.87 per household trip is reported. The average days per household per trip is 1.1 resulting in a value of $8.97 per household per day. The average number of people per houshold trip is 1.4 resulting in a value of $6.41 per visitor day.

Region 4

A region-wide value was derived by Hansen (1977) using the Contingent Valuation Method. Data was obtained from the 1975 U.S. Fish and Wildlife Service Hunting and Fishing Survey. The mail survey was noniterative open-ended questionnaire. A value of $20.12 per visitor day is reported.

Region 8

Waterfowl hunting in a marsh area of south central Louisiana was valued by Bell (1981) using the Hedonic Method. Data from the 1975 National Survey of Hunting and Fishing and the 1975 Atchafalaya Basin Users Survey was analyzed. The study adjusted for substitutes and travel time. A value of $15.41 per visitor day is reported.

Region 9

Goose hunting in Wisconsin was valued by Bishop and Heberlein 1980 using several methodologies. Each method, however, derived a value for a goose hunting permit. A value of $63 represents the average cash payment accepted to give up a goose hunting permit. The format involved checks from $1 to $200 sent to current holders of permits. They could either accept the check and give up the permit or vice versa. A different sample was asked hypothetical willingness to pay additional money for a permit. The survey format was an open-ended mail questionnaire. This resulted in an average net willingness to pay of $21.00 per permit. A third sample was asked questions which allowed implementing the zonal Travel Cost Method. The TCM results ranged from $7.00 per permit when no adjustment was made for travel time to $32.00 per permit when travel time was valued at 1/4 the wage rate. Data for each method was collected in 1978.

II. METHODOLOGICAL ADJUSTMENT

A. Conversion of study data date to a 1982 base year.

The Pacific Flyway value of $25.00 converts to a 1982 value of $61.11.

Region 3

Martin, Smith, and Gum's study value of $6.41 for Arizona converts to a 1982 value of $14.14.

Region 4

Converting the regionwide value of $20.12 to a 1982 base results in a value of $32.34.

Region 8

Bell's south central Louisiana value of $15.41 becomes $24.77 when converted to a 1982 base.

Region 9

The Wisconsin goose permit cash payment value of $63.00 converts to a 1982 value of $84.73. The hypothetical willingness to pay value of $21.00 converts to a 1982 value of $28.24. Converting the Travel Cost value of $32.00 into 1982 dollars rsults in a value of $41.66.

C. Adjustment for individual observation.

The expert panel decided that the probability of participation in waterfowl hunting is not inversely related to travel cost. Therefore, no adjustment for individual observations is necessary for studies which utilized individual observation TCM.

D. Adjustment due to instate sample.

Waterfowl hunting is considered to be a multi-state activity. As a result, the expert panel felt studies which were limited to an instate sample should have a 15 percent upward adjustment in the reported value. This adjustment is necessary only in the case of

Martin, Gum, and Smith's Arizona study. A 15 percent upward adjustment results in a value of $16.26.

III. VALUES FOR REGIONS WITH STUDIES

Region 3

Including Hammack and Brown's study values in this region range from $16.26 to $61.11. The quality of waterfowl hunting is similar in Arizona and New Mexico, but it is much more scarse in New Mexico indicating the Arizona value of $16.26 needs to be adjusted upward to reflect scarcity in Arizona. The quality of waterfowl hunting in Arizona when compared to the entire Pacific is very poor. Hammack and Brown's Pacific Flyway value should be adjusted downward considerably to reflect the poorer quality. Under these considerations, a value of $25.00 is suggested for Region 3. Because of the methodology of these studies, this value is also suggested for a 12-hour RVD.

Region 4

Adjusted values range from $32.34 to $61.11. Quality in the Intermountain Region is very good. Unfortunately habitat is limited giving rise to scarcity problems. Since the quality of Region 4 is greater than Region 3, but Region 4 is not as great as the northern portion of the entire flyway, a value nearer the lower part of the adjusted range is appropriate. Hansen's value is based on the entire region, therefore, a value of $32.00 is suggested. This represents a 12-hour RVD.

Region 6

Hammack and Brown have a Pacific Flyway adjusted value of $61.11. In this flyway the best waterfowl hunting is in Washington and Oregon. Not only is quality good, but scarcity is not nearly the problem for Region 6 that it is for other regions in the flyway. The supply of waterfowl hunting relative to human populations is not a major problem indicating Hammack and Brown's value should be adjusted downward. A value of $40.00 is suggested for an activity day and a 12-hour RVD.

Region 5

Hammack and Brown's adjusted value is $61.11. As was the case for Region 3, California has a much lower quality of waterfowl hunting relative to the rest of the flyway. The supply of waterfowl hunting relative to human populations is low, but the lower hunting quality is the more dominant factor. Since scarcity is more of a problem in Region 5 than Region 3, Region 5 should have a slightly higher value than Region 3, but also a value much below Hammack and Brown's due to the lower quality. A value of $30.00 is suggested. This value represents a 12-hour RVD.

Region 8

Bell's south central Louisiana adjusted value is $24.77. Three flyways go through Region 8; central, Mississippi, and Atlantic flyway. The Mississippi Flyway runs next to Bell's study. Therefore, quality is similar in this area relative to the rest of the region. The three flyways running through the region give it a high quality. Since quality is similar outside of Bell's study area and scarcity is also the same, Bell's value is appropriate. A value of $25.00 is suggested to reflect an activity day and a 12-hour RVD.

Region 9

Adjusted values for Bishop and Heberlein's Wisconsin goose study range from $28.24 to $84.73. The Hurricone Marsh where this study was set has excellent waterfowl hunting. However, much of Region 9 has outstanding waterfowl hunting. The Mississippi and Atlantic Flyways pass through this region and with the abundance of lakes and ponds, quality is high while scarcity is relatively low. The upper adjusted value of $84.73 is may be too high since the study does not appear to measure minimum willingness to accept rather what was actually accepted. For example, an individual may have been willing to accept $20.00 for his permit, but was offered $40.00. This could result in an overestimate of his willingness to accept. A value greater than the lower end of the range is appropriate to reflect high quality and minimum scarcity. A value of $31.00 is suggested for an activity day. In accordance with the study design, this value also represents a 12-hour RVD.

IV. VALUES FOR REGIONS WITHOUT STUDIES

Region 1

Both Montana and North Dakota possess exceptional waterfowl hunting in relative abundance. The Central Flyway covers most of this region and originates just north indicating higher quality and higher abundance than further south. The high quality would indicate high value, however, the low scarcity problem pulls down the value; closely in line with Region 6. A value of $39.00 is suggested for both an activity day and a 12-hour RVD.

Region 2

The northern portion of this region has high quality waterfowl hunting but as the Central Flyway moves south, some of this quality deteriorates. Quality does not become as poor as Arizona, but it does not compare with the far north. The supply of waterfowl hunting relative to human populations is of a moderate problem but not as bad as the western bordering region. A value between Region 3 and 4 and also below Region 1 is appropriate. A value of $28.00 per activity day is suggested. This value represents a 12-hour RVD.

WATERFOWL HUNTING	Region 1	Region 2	Region 3		Region 4		Region 5	Region 6	Region 8	Region 9		
Study Location			Ariz.	Pac. Flyway		Pac Flyway	Pac. Flyway	Pac. Flyway		Wis.	Wis.	Wis.
Author			Martin Gum Smith	Hammack Brown	Region Hansen	Hammack Brown	Hammack Brown	Hammack Brown	Louis. Bell	Bishop Heberlein	Bishop Heberlein	Bishop Heberlein
Date of Data			1970	1968	1975	1968	1968	1968	1975	1978 Cash	1978 CVM	1978 TCM
Reported Value/ Activity Day			6.41	25.00	20.12	25.00	25.00	25.00	15.41	63.00	21.00	32.00
Adjustment to 1982			14.14	61.11	32.34	61.11	61.11	61.11	24.77	84.73	28.24	41.66
Adjustment to Include Value of Travel Time												
Adjustment for Individual Observation												
Adjustment for Instate Only			16.26									
Adjusted Reported Values/ Activity Day	None	None	16.26	61.11	32.34	61.11	61.11	61.11	24.77	84.73	28.24	41.66
Regional Values per Activity Day				25.00		32.00	30.00	40.00	25.00		31.00	
Regional Values/12-hour RVD (with Studies)				25.00		32.00	30.00	40.00	25.00		31.00	
Regional Values/12-hour RVD (without Studies	39.00	28.00										

WATER SPORTS

I. LITERATURE REVIEWED

Region 3

The first study was done by Ward (1982) using individual observation Travel Cost Method. The study valued lake and reservoir water-based recreation in southeastern New Mexico. Data was collected in 1978. Substitutes and travel time were adjusted for in the TCM application. An average dollar value of $11.39 per activity day was derived.

Another study for Region 3 was done by Martin, Gum, and Smith (1974) for general outdoor recreation which included water sports. The study derived a statewide average for Arizona using the individual observation Travel Cost Method. Substitutes and travel time were adjusted for in the TCM application. A value of $66.54 was found per household per trip. The average number of days per trip is 1.4 and number in household is 3.4 persons. The resulting valus is $13.98 per visitor day or $14.

Region 8

The zonal Travel Cost Method was used by Gruff and Goodwin (1968) to derive water sport values in Texas. Data was collected in 1965. Adjustments were made in the study for substitutes; however, no adjustments were made for travel time. An average value of $3.80 per visitor day was found.

In Florida, Gibbs (1974) ran a variant of the individual observation Travel Cost Method for lake and stream recreation. Data was collected in 1970. This TCM study was unusual in that it used cost per day on site as the price variable. The value derived was $21.62 per two day trip, resulting in a value of $10.31 per visitor day.

Region 9

Swimming for the State of New York was valued by Kalter and Gosse (1969) using the zonal Travel Cost Method. The study did not adjust for substitutes or travel time. An average value of $9.47 per day was derived.

II. METHODOLOGICAL ADJUSTMENT

A. Conversion of Study Data to a 1982 Base Year

Converting the study date of Martin, Gum, and Smith's Arizona study results in a value of $30.84. New Mexico date of study conversion gives a value of $15.32.

Region 8 values convert to $23.78 and $10.31 for Florida and Texas, respectively.

Kalter and Gosse's New York study converts to a value of $20.83.

B. Adjustment for Omission of Travel Time

As discussed in the introduction, studies which omitted travel time should be adjusted upward by 30 percent. The value of $10.31 in Region 8 will adjust to $13.40 and $23.78 to $31. The value of $20.83 in Region 9 will adjust to $27.00.

C. Adjustment for Individual Observations

As discussed in the introduction, water sport studies which derived values using individual observations should be adjusted downward because there is a strong inverse relation between probability of participation and travel cost. This adjustment is necessary for the studies in Region 3. The Arizona value of $30.84 adjusts downward to $20.66. The New Mexico value of $15.32 adjusts downward to $10.26.

D. Adjustment Due to Instate Sample

Kalter and Gosse (1969) and Martin, Gum, and Smith (1974) values are conversion estimates due to restriction of sample of instate users; however, for this type of activity, the expert panel did not feel this was a major enough problem to warrant explicit adjustment.

III. VALUES FOR REGIONS WITH STUDIES

Region 3

Values ranged from $10.26 to $20.66. The Arizona study was a statewide average, hence, typical for the state. The New Mexico study was done in the southeaster part of the state which has low population density. Therefore, the supply of the resource is not relatively scarce. Since most of the population of New Mexico is concentrated in the Central and Northern part of the state, a higher state average would be expected. Given these considerations a value of $14.00 per activity day seems appropriate. This activity would appear to generally involve a majority of the day. The guidance given to us would recommend this value be used for a 12-hour recreational visitor day.

Region 8

Adjusted values ranged from $13.40 to $20.65. The Texas value of $13.40 is a statewide average, also representative of bordering states such as Oklahoma and Arkansas. Given the unusual form of the Florida TCM study, the value of $20.65 is high for the state as a whole. This activity seems to be distributed with the same density in the remaining states in the region as with the states in the studies. A value of $15.00 is appropriate. As before, this value represents a 12-hour RVD.

Region 9

The Kalter and Gosse study found a New York state average of $27. This does not seem too high for New York given the large population pressures and scarcity of public land for such activities on a per capita basis. This value is too high for Region 9 as a whole since states to the south have beaches as better substitutes and the "Great Lake States" have populations close to the Great Lakes as well as thousands of small lakes. Thus, a value closer to $18 seems reasonable. This is the value recommended per RVD for Region 9.

IV. VALUES FOR REGIONS WITHOUT STUDIES

Region 2

Supply relative to the population in Region 2 is similar to Region 8; however, quality of the resource setting in National Forests is greater in Region 2. Given the cooler temperatures of Region 2 relative to Region 3, a value of $12 seems appropriate. This value would represent a 12-hour RVD.

Region 1

Supply relative to the population in Region 1 is greater than in Region 2, although the resource setting is similar. Temperatures in Region 1 are significantly lower than Region 3 and most of Region 2. A regional value of $10.00 is appropriate. This value is indicative of a 12-hour RVD.

Region 4

Region 4 combines resource settings similar to those of Regions 2 and 3; however, the supply relative to population is more similar to Region 2. Region 2's value of $12.00 seems appropriate for Region 4 also.

Region 5

Region 5's resource supply relative to its population is lower than any other region. Perhaps similar only to the eastern portion of Region 9. California does have a high proportion of National Forests and ocean border, more so than Region 9, indicating higher quality. It would seem appropriate that Region 5 has a day use value slightly higher than Region 9 because of greater scarcity, higher quality, and warm year round temperatures. A value of $17.00 seems appropriate.

Region 6

Supply relative to population in Region 6 is greater than Region 4 indicating a lower value for Region 6. However, with the abundance of National Forests, the resource setting in Region 6 is of higher quality than the resource setting in Region 4. These considerations seem to balance out, leaving Region 6 with the same value as Region 4. The value of $12.00 represents a 12-hour RVD.

WATER SPORTS	Region 1	Region 2	Region 3		Region 4	Region 5	Region 6	Region 8		Region 9
Study Location			Arizona							
Author			Martin Gum &	N. Mexico				Gruff &		Kalter and
Date of Data			Smith (1970)	Ward (1978)				Goodwin (1965)	Gibbs (1970)	Gosse (1970)
Reported Value per Activity Day			14.00	11.39				3.80	10.31	9.47
Adjustment to 1982			30.84	15.32				10.31	23.78	20.83
Adjustment for Omission of Travel Time								13.40	31.00	27.00
Adjustment for Individual Observation TCM			20.66	10.26					20.65	
Adjustment Reported Value per Activity Day			20.00-10.00						13.40-20.65	27.00
Regional Values per 12-hour RVD for Regions w/Studies			14.00						15.00	18.00
Regional Values per RVD for Regions w/out Studies	10.00	12.00			12.00	15.00	12.00			

WILDERNESS

I. REVIEW OF THE LITERATURE

Region 2

Perhaps the best empirical estimates for wilderness recreation has been done in Colorado. The most recent work was by Walsh and Gilliam (1982). They applied the Contingent Value Method to estimating benefits of wilderness hiking and backpacking in Indian Peaks Wilderness Area in Colorado. This was an on site personal interview that used the Contingent Value Method with an interative bidding format. They reported values associated with a wide range of different levels of congestion. Table 1 of Walsh and Gilliam presents the mean congestion levels for hiking and backpacking and they were used to locate the dollar values in Table 2. These values are $10.31 for hiking per activity day and $18.29 for backpacking per activity day.

A state wide average value of wilderness was calculated by Walsh, Gillman, and Loomis (1980) for wilderness and roadless area recreation using the individual observation Travel Cost Method. This was based on a sample of over 200 state residents. Travel time, substitues, tastes-preferences, and income were all accounted for and included in the regression when statistically significant. The study found a value of $14.00 per visitor day.

Region 4

In Utah, Loomis (1979, 1980) estimated the hiking and backpacking values associated with two administratively designated primitive areas in Southern Utah. Using the Zonal Travel Cost Method, the values were $8.00 per visitor day for Grand Gulch and $15.00 per vistor day for Paria Canyon.

No adjustment was made for travel time, however. Since these were high desert, primitive areas, the justification for using these studies rests on the concept of ROS zones. That is recreation opportunities that share the same ROS classification provide a similar experience even if the ecosystem is different. Further research in this Region on Forest Service land is obviously needed.

Region 5

Smith and Kopp (1980), estimated using 1972 data, the average recreation value per visit to the Ventana Wilderness in California was $10.04 with individual estimates ranging between $5.28 and $14.80 depending on the assumptions made about the maximum distance for single purpose trips. However, these authors used only one way distance and did not adjust for travel time. Since it is well established that round trip distance or travel cost is necessary (Dwyer, Kelly, and Bowes, 1977 and Walsh, 1977), adjustment is necessary even before the omission of travel time can be corrected to later. In a footnote to the longer version of this Smith and Kopp paper, they indicated that to recalculate their consumer surplus figures to adjust to round trip mileage that one can just double the benefit estimates. Doing this then results in a value of $20.08 per visit before adjusting for travel time. Putting this on a per visitor day bias using data provided by the District Ranger results in a value of $8.03 an RVD in 1972.

Region 6

Using a zonal Travel Cost Method, Brown and Plummer (1979) estimated the wilderness recreation value for two wilderness areas in Washington: Glacier Peak (GP) and Goat Rocks (GR) and two in Oregon: Eagle Cap (EC) and Diamond Peak (DP). The values per day were $40 for GP, $37 for GR, $44

for DP, and $54 for EC. However, since this study did not adjust for travel time, these values must be adjusted upwards. These values reflect an upper limit truncation made by Brown and Plummers to insure single purpose trips. The values without this upper limit truncation were $100 per day. The data for the zonal TCM reflects both instate and out of state residents.

II. METHODOLOGICAL ADJUSTMENTS

A. Adjust to 1982 Base Year.

Conversion of the two Colorado studies by Walsh - Gillman and Walsh, et al. (1981) to 1982 base year leads to values of 12.78 - 22.68 and 15.93, respectively. Conversion of the average of the values reported by Loomis, yields a value of $14.95. Updating Smith and Kopps values from 1972 to 1982 yields a value of 15.77. Taking the average of all 4 wilderness areas reported by Brown and Plummer and updating them yields a value of 56.87 per day.

B. Adjustment of Omission of Travel Time.

Neither of the two studies by Loomis adjusted for travel time and so correcting for this increased the value from $14.95 to $19.45 per activity day. The Smith and Kopp study also omitted consideration of travel time and its corrected value is $20.50 per activity day. The Brown and Plummer values also reflect failure to adjust for travel time. Correcting this leads to a value of 73.93 per activity day.

C. Adjustment for Instate Sample.

Only Walsh, Gillman, and Loomis (1981) had a survey which was limited to instate sample. Since wilderness areas in Colorado draw from a multi-state area, this was agreed to be a significant concern. Therefore, a 15% upward adjustment is necessary. This makes the $15.75 value $18.32.

III. VALUES FOR REGIONS WITH STUDIES

Region 2

The value of wilderness recreation in Colorado has a value of $12 for hiking, $22 for backpacking, and $18 for combined use in a state survey. The $18 figure is a state average so is fairly representative. However, a bulk of the RVD's are due to backpacking so a value closer to $22 would seem appropriate. Perhaps $20 is a good average. This value would seem to be appropriate to Wyoming as well due similarity in National Forest Wilderness Areas in these states. Wilderness is must scarcer in Kansas, Nebraska, and South Dakota. The quality in South Dakota is not to different than in Colorado and Wyoming. Thus a regional value of $20 seems appropriate for Region 2.

Region 4

The average value in Utah was $19.45. However this was for a high desert type of wilderness. This is similar to the value of national forest wilderness in parts of Southern Idaho, Southern Utah, and Nevada. However, parts of Idaho in Region 4, Northern Utah and Southern Wyoming have some of the most outstanding wilderness in the county. While low population pressures reduces demand it produces a uncongested wilderness experience. Thus a value of $20 would seem appropriate for wilderness recreation in Region 4. This will be used as the value per RVD.

Region 5

The one study in California has a value of $20.50. In discussion with the District Ranger for the wilderness area that this study was performed is indicated that this area did not have many of the outstanding features of other wilderness areas in California. That is, the hundreds of alpine lakes and high mountain passes characteristic of the John Muir Wilderness

or the Desolation Wilderness was not present. Since the study area is about equi-distant from major population centers as these wilderness areas named above, a net value slightly above the study area value would seem appropriate. Given the high demand in California due to population, income, education, and tastes, coupled with the quality resource a value of $22 seems appropriate per activity day. This will also be the value per RVD.

Region 6

The four wilderness areas average value in Region 6 is $77.93. This is quite a bit higher than the values found in neighboring regions. Given the close proximity of the wilderness reosurce to population centers and the high quality and uniquness of the resource, a higher value would be expected. Reenforcing this is the relatively high population levels in Washington (Seattle-Tacoma-Evertt).

To be conservative and consistent with other regions, a value of around $30-$40 would seem appropriate. Again to be conservative, value of $28 will be recommended for Region 6 until more empirical work is performed.

IV. VALUES FOR REGIONS WITHOUT STUDIES

Region 1

Region 1 is made up of Northern Idaho and Montana. These areas have some of the most outstanding wilderness areas in the National Wilderness Preservation System. Due to low population pressures these areas offer a high quality - uncongested wilderness experience. However, this low population pressure and remotness from major population centers implies that the demand is low relative to the supply. Thus a value close to that

of Region 4 seems reasonable since they share similar population to supply configurations and not too different wilderness resources. Thus a value of $20 is recommended for Region 1 per RVD.

Region 3

Region 3 is made up of New Mexico and Arizona. This Region would have wilderness values per RVD similar to Region 2 and the southern portion of Region 4. The National Forest Wilderness resource is scarcer in Region 3 than in Region 2. Therefore, a value of $22 per RVD seems a reasonable recommendation for Region 3 given the values in adjacent region.

Region 8

Wilderness resources are quite scarce in Region 8 relative to population. However, the natural quality is slightly below that of western wilderness as well as the congestion effects further reducing the quality. Much of the wilderness resource that does exist is some distance from major population centers (the seaboard) further reducing the net value to individuals. However, the high demand due to large population and makes the value relatively high. A value of $25 per RVD seems reasonable given the large populations and great scarcity.

Region 9

The wilderness resource is very scarce relative to the large population in the Northeastern U.S. However, what little wilderness exists is some distance from major population centers and this reduces the net value. Some of the wilderness areas in the eastern and southern portions

of Region 9 do not have the quality found in western wilderness areas. However, the demand in Region 9 is probably the highest in the nation and supply is quite scarce. Taking these later factors into account, a value of $28 per RVD would seem appropriate for Region 9, given that Kalter and Gorse adjusted value for hiking in New York State was between $35 and $45. (See hiking section).

WILDERNESS	Region 1	Region 2	Region 3	Region 4	Region 5	Region 6	Region 8	Region 9
Study Location		Colorado	Colorado		Calif.			
Author		Walsh	Walsh		Smith	Brown		
Date of Data		Gillian 1979	et al. 1980	Loomis 1979-1980	Kopp 1972	Plummer 1978		
Reported Value/ Activity Day		10.31-18.29	14.00	11.50 avg	8.03	43.75 avg		
Adjustment to 1982		12.78-22.68	15.93	14.95	15.79	56.87		
Adjustment for Value of Travel Time				19.45	20.50	73.93		
Adjustment for Individual Observation								
Adjustment for Instate Only			18.32					
Adjusted Reported Values per Activity Day		12.78-27.68	18.32	19.45 avg	20.50	73.93 avg		
Regional Values per Activity Day			20.00	20.00	22.00	28.00		
Regional Values per 12-hour RVD w/Studies			20.00	20.00	22.00	28.00		
Regional Values per 12-hour RVD w/out Studies	20.00			22.00			25.00	28.00

LITERATURE CITED

Bell, Fredrick, 1981. Recreational benefits for the Atchafolaya River Basin, Contract report number 14-16-009-80-009, for U.S. Fish and Wildlife Service by Dept. of Economics, Florida State University.

Bianchi, Dennis. 1969. The economic value of streams for fishing. University of Kentucky, Water Resources Institute, Research Report No. 25.

Bishop, Richard C. and Thomas A. Heberlein. 1980. Simulated markets, hypothetical markets, and travel cost analysis. University of Wisconsin, Madison, No. 187.

Bowes, Michael D. and John B. Loomis. 1980. A note on the use of travel cost models with unequal zonal populations. Land Economics 56(4): 465-470.

Brookshire, David, Mark Thayer, William Schulze, and Ralph C. d'Arge. 1982 "Valuing public goods: A comparison of survey and Hedonic approaches." American Economic Review 72(1): 165-177.

Brown, Gardner and Stephen B. Mathews. 1970. Economic evaluation of the 1967 sport salmon fisheries of Washington. Washington Department of Fisheries, Technical Report No. 2.

Brown, Gardner and Mark Plummer. 1979. Recreation valuation, Appendix A.5, of an economic analysis of nontimber uses of forestland in the Pacific Northwest. Forest Policy Project, Washington State University.

Brown, William, D. M. Larson, R. S. Johnston and R. J. Wahle. 1976. Improved economic evaluation of commercially and sport caught salmon and steelhead of the Columbia River. Special Report 463, Corvallis, Oreg.

Brown, William, Colin Sorhus, and Kenneth Gibbs. 1980. Estimated expenditure by sport anglers and net economic values of salmon and steelhead for specified fisheries in the Pacific Northwest. Dept. of Economics, Oregon State University.

Brown, William, Colin Sorhus, Bih-lian Chou-Yang, and Jack A. Richards. A note of caution on the use of individual observations for estimating outdoor recreational demand functions, forthcoming American Journal of Agricultural Economics.

Brown, William, Farid Naivas, and Joe Stevens. 1973. The Oregon big game resource: an economic evaluation. Special Report 379, Agricultural Experiment Station, Oregon State University, Corvallis, Oreg.

Bocksteal, Nancy and Kenneth McConnel. 1981. Theory and estimation of the household production function for wildlife recreation. Journal of Environmental Economics and Management 8. p. 199-214.

Cesario, Frank. 1976. Value of time in recreation benefit studies. Land Economics 52(1): 32-40.

Cesario, Frank and Jack Knetsch. 1970. Time bias in recreation benefit estimates. Water Resources Research 6(3): 700-705.

Chiccetti, C. J. 1973. Forecasting Recreation in the United States. Lexington Books, D. C. Heath and Company, Lexington, Mass.

Clawson, Marion and Jack Knetsch. 1966. Economics of Outdoor Recreation. The Johns Hopkins University Press, Baltimore, Md.

Crutchfield, James A. and Kurt Schelle. 1978. An economic analysis of Washington ocean recreational salmon fishing with particular emphasis on the role played by the charter vessel industry. Dept. of Economics, University of Washington, Seattle, Wash.

Dwyer, John. 1978. Estimating recreational values for the 1980 RPA program. Paper presented at RPA Workshop of Resource Value. Washington, D.C., May 8-9, 1978.

Dwyer, John, John Kelly, and Michael Bowes. 1977. Improved procedures for valuation of the contribution of recreation to national economic development. Water Resources Center Report No. 128. University of Illinois at Urbana, Champaign, Il.

Fisher, Warren. 1982. Travel cost and contingent value estimates explored. Eastern Economics Association, May 1, 1982.

Gibbs, Kenneth. 1974. Evaluation of outdoor recreational resources: a note. Land Economics 50(3): 309-311.

Gordon, Douglas. 1970. An economic analysis of Idaho sport fisheries. Idaho cooperative fishery unit, Idaho Fish and Game Department.

Grubb, Herbert and James Goodwin. 1968. Economic evaluation of water oriented recreation in the preliminary Texas water plan. Texas Water Development Board No. 84.

Hammack, Judd and Gardner Brown. 1972. A preliminary investigation of the economics of migratory waterfowl. Natural Environments: Studies in Theoretical and Applied Analysis, edited by John V. Krutilla. Johns Hopkins University Press, Baltimore, Md.

Hansen, Chris. 1977. A report on the value of wildlife. Intermountain Region, U.S. Forest Service, Ogden, Utah.

Hendee, John, George Stankey, and Robert Lucas. 1978. Wilderness management. U.S. Department of Agriculture, Miscellaneous Publication No. 1365.

Hof, John and Fred Kaiser. 1981. Long term recreation participation projections for public land management agencies, forthcoming in Journal of Leisure Research.

Kalter, Robert and Lois Gosse. 1969. Outdoor recreation in New York State: projections of demand, economic value, and pricing effects for the period 1970-1985. Special Cornell Series No. 5, Cornell University.

Keith, John, Phil Halverson, and Lon Furnworth. 1982. Valuation of a free flowing river: the Salt River, Arizona. Report by Utah State University to Army Corps of Engineers.

King, David and Ann Walka. 1980. A market analysis of trout fishing on Fort Apache Indian Reservation. School of Renewable Natural Resources, University of Arizona, Tuscon, Ariz.

Knetsch, Jack and Robert Davis. 1966. Comparisons of methods for recreation evaluation. Water Research, Johns Hopkins Press, Baltimore, Md.

Knetsch, Jack, Richard Brown, and William Hansen. 1976. Estimating expected use and value of recreation sites. In Planning for Tourism Development: Quantitative Approaches, C. Gearing, W. Swart, and T. Var, editors. Proeger, N.Y.

Krutilla, John V. and Anthony Fisher. 1975. The Economics of Natural Environments, Johns Hopkins University Press, Baltimore, Md.

Loomis, John B. 1979. Estimation of recreational benefits from Grand Gulch Primitive Area. Moab District Office, Bureau of Land Management, Moab, Utah.

Loomis, John B. 1980. Monetizing equity-efficiency trade-offs in rationing wilderness use. Western Energy and Land Use Team, U.S. Fish and Wildlife Service, Fort Collins, Colo.

Loomis, John B. 1982. Use of travel cost models for evaluating lottery rationed recreation: application to big game hunting. Journal of Leisure Research

Loomis, John. 1982. Westward migration: putting pressure on public lands. Western Wildlands.

Martin, William and Russel Gum. 1978. Economic value of hunting and fishing and general rural outdoor recreation. Wildlife Society Bulletin.

Martin, William, Russel Gum, and Arthur Smith. 1974. The demand for and value of hunting, fishing, and general rural outdoor recreation in Arizona. Technical Bulletin 211. The Agricultural Experiment Station, University of Arizona, Tucson, Ariz.

McConnel, Kenneth. 1979. Values of marine recreational fishing: measurement and impact of management. American Journal of Agricultural Economics 61: 921 925.

McConnel, Kenneth and Ivar Strand. 1981. Measuring the cost of time in recreation demand analysis: an application to sportfishing. American Journal of Agricultural Economics 63(Feb): 153-156.

Michaleson, Edgar. 1977. An attempt to quantify the esthetics of wild and scenic rivers in Idaho. In Proceedings of a Symposium on River Recreation Management and Research, General Technical Report NC-28, U.S. Dept. of Agriculture, Forest Service, North Central Station, St. Paul, Minn.

Michaleson, Edgar and Campbell Gilmour. 1978. Estimating the demand for outdoor recreation in the Sawtooth Valley, Idaho. Research Bulletin No. 107, Agricultural Experiment Station, University of Idaho, Moscow, Idaho.

Miller, Ronald. 1980. The demand for the Colorado deer hunting experience. Unpublished Ph.D dissertation, Dept. of Economics, Colorado State University, Fort Collins, Colo.

Rosenthal, Donald. 1982. Letter to Dr. Andrew Farkas, U.S. Dept. of Agriculture, Forest Service, Washington, D.C.

Schulze, William, Ralph d'Arge, and David Brookshire. 1981. Valuing environmental commodities: some recent experiments. Land Economics 57(2): 151-172.

Smith, Kerry and Raymond Kopp. 1980. Spatial limits of the travel cost recreational demand model. Land Economics 56(1): 64-72.

Sutherland, Ronald. 1980. A regional recreation demand and benefits model. Corvallis Environmental Research Laboratory, U.S. Environmental Protection Agency, Corvallis, Oreg.

U.S. Fish and Wildlife Service. 1980. National survey of fishing, hunting and wildlife associated recreation. Personal communication with Dr. M. Hay, Division of Program Plans.

U.S. Water Resources Council. 1979. Procedures for evaluating of national economic development (NED) benefits and costs in water resources planning, Final Rule. Dec. 14, 1979, Federal Register

Vaughan, William and Clifford Russel. 1981. Valuing a fishing day. Discussion Paper D-77, Resources for the Future, Washington, D.C.

Walsh, Richard. 1977. Effects of improved research methods on the value of recreational benefits. Outdoor Recreation: Advances in Application of Economics. General Technical Report WO-2, U.S. Dept. of Agriculture, Forest Service.

Walsh, Richard, Robert Aukerman, and Robert Milton. 1980. Measuring benefits and the economic value of water in recreation on high country reservoirs. Colorado Water Resources Research Institute, Colorado State University, Fort Collins, Colo.

Walsh, Richard, Ray Ericson, Daniel Arosteguy, and Michael Hansen. 1980. An empirical application of a model for estimating the recreation value of instream flow. Colorado Water Resources Research Institute, Colorado State University, Fort Collins, Colo.

Walsh, Richard. 1982. Letter to the White River National Forest.

Walsh, Richard, Richard Gillman, and John Loomis. 1981. Wilderness resource resource economics: recreation use and preservation values. Dept. of Economics, Colorado State University, Fort Collins, Colo.

Walsh, Richard and Lynde Gilliam. "Benefits of Wilderness Expansion with Excess Demand for Indian Peaks." Western Journal Ag Economics, Vol. 7. July 1982.

Walsh, Richard and John Olienyk. 1981. Recreation demand effects of mountain pine beetle damage to the quality of forest recreation resources in the Colorado Front Range. Dept. of Economics, Colorado State University, Fort Collins, Colo.

Ward, Frank. 1982. The demand for and value of recreational use of water in southeastern New Mexico 1978-79. Agricultural Experiment Station Research Report No. 465, New Mexico State University, Las Cruces, N.M.

Weithman, Stephen and Mark Haas. 1982. Socioeconomic value of the trout fishery in Lake Taneycomo, Missouri. Transactions of the American Fisheries Society 111. p. 223-230.

Wennegren, Boyd, Herbert Fullerton, and Jim Wrigley. 1973. Estimation of quality and location values for resident deer hunting in Utah. Bulletin 448, Utah Agricultural Experiment Station, Utah State University, Logan, Utah.

Wilman, Elizabeth. 1980. The value of time in recreation benefit studies. Journal of Environmental Economics and Management 7. p. 272-286.

Wilman, Elizabeth. 1982. Personal communication with U.S. Forest Service.

Ziemer, Rod, Wesley Musser, and Carter Hill. 1980. Recreation demand equations: functional form and consumer surplus. American Journal of Agricultural Economics 62(Feb): 136-141.